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ORIGINAL COMMUNICATIONS.

ART. I.—CRITICISMS AND SUGGESTIONS RESPECTING NOMENCLATURE.

By Robert Hare, M. D., Professor of Chemistry in the University of Pennsylvania.

ALSO, A LETTER FROM THE CELEBRATED J. J. BERZELIUS.

[*To the Editors of the Journal of Pharmacy.*]

Philadelphia, *March 4th*, 1837.

Dear Sirs—In September, 1833, I published in your Journal, together with some encomiums upon the Treatise of Chemistry by the celebrated Berzelius, certain objections to his nomenclature, and some suggestions respecting a substitute, which I deemed to be preferable. In the following June I addressed a letter to Professor Silliman upon the same topics, in which my criticisms and suggestions were amplified and corrected in obedience to more mature reflection. A printed copy of that letter having been sent by me to Berzelius, I received in answer an epistle, of which I furnish you with a translation.

Since the period of that correspondence, so demonstrative of candor and good feeling on the part of the great Swedish chemist, I have published two editions of my Compendium of Chemistry, in which I have pursued a course corresponding with my criticisms above alluded to. I am therefore desirous, in addition to the letter of Berzelius to lay before the public a recapitulation, review, and an additional explanation of the grounds upon which I have ventured to employ a language,

and an arrangement inconsistent with the practice and opinions of a chemist by whose authority in other respects I am usually influenced. But before proceeding with the ungracious task of endeavouring to establish the correctness of my views in opposition to those of my friend, I feel that it will be no more than justice to repeat an acknowledgment, already made in my text book, that if DE BONSDORFF, myself, and others are right in considering the *double* salts of BERZELIUS as *simple* salts, it is to the light afforded by his investigations, that we owe the power of seeing the subject correctly. I believe the idea, that any other body besides oxygen could produce both acids and bases capable of forming salts, originated with BERZELIUS, in the instance of sulphur.

Recapitulation and review of the grounds of his deviating from the language and arrangement of BERZELIUS, *and other distinguished chemists; with some additional explanations and suggestions, by* R. HARE, *M. D., Professor of Chemistry in the University of Pennsylvania.*

According to the BERZELIAN nomenclature, bodies which produce salts by a union with radicals are called *halogen* or *salt producing bodies*, while those which with radicals form both acids and bases, capable by their union of constituting salts, are called *amphigen bodies* or *both producers*. Salts, produced by the first mentioned class are called haloid salts; Those produced by the other are called amphide salts.

I objected to this classification, that the words *salt*, *acid* and *base*, were broad, vague and unsettled in their acceptation, having, by chemists in general, and especially by BERZELIUS, been employed to designate substances differing in composition, and extremely discordant in their properties; that no method of defining a salt had been devised, which had not been founded either on properties or composition; that in the nomenclature of BERZELIUS properties were disregarded, since among his haloid and amphide salts were found substances differing extremely in this respect. Thus, for instance, common salt, Glauber's salt, Epsom salt, vitriolated

tartar, and cream of tartar, were associated with the fuming liquor of Libavius, the butyraceous chlorides of zinc, antimony, and bismuth, plumbum corneum, luna cornea, fluor spar, and the acid fluorides of silicon and boron. I objected also that composition could not be resorted to consistently with his classification; since, agreeably to it, a salt might be either a binary compound of a halogen body with a radical, or consist of two binary compounds, each containing the same amphigen body.

To the terms *acid* and *base*, as employed in his nomenclature, I objected, that neither by the celebrated author, nor by any other chemist had any definition been adhered to which could, consistently with his plan, restrict the meaning of those appellations to the binary compounds formed by the union of his amphigen bodies with radicals.

Acidity and basidity* had sometimes been distinguished by an appeal to properties, sometimes to composition, but to neither had there been any consistent attention. In order to demonstrate the total neglect of properties latterly displayed, it was only necessary to contrast substances bearing generally the name of acids; as for instance sulphuric acid with rock crystal, acetic acid with tannin, and prussic acid with margaric; or to contemplate simultaneously the admission of the hydracids formed with the halogen bodies into the class of acids, while alleged incapable of combining with bases, with the exclusion from that class of nitrous acid, upon the plea of the same incapacity.

In reference to neglect of composition in forming the class of acids, it will be sufficient to advert to the association in that class, of compounds formed with radicals both by the halogen and amphigen bodies; so that the halogen bodies are in one case producers of salts, in the other producers of acids; in one case act as supporters, acidifiers, or electro-negative principles, in another as radicals to the comparatively electro-

* For the use of the words basidity and salidity, I have no authority; but conceive that through their analogy with acidity their meaning is so obvious as to make it expedient to employ them.

positive hydrogen, pre-eminently a radical by the definition of that word given in the treatise of the distinguished author of the nomenclature.

After stating my objections to the basis of the BERZELIAN nomenclature, I proceeded to mention those to which I considered the superstructure as liable.

Having designated the acid compounds of his amphigen class, by prefixing syllables indicating their electro-negative ingredients; having also in some instances, as in those of the fluosilicic, and fluoboric acids, adopted this course in relation to halogen bodies; I objected to the use of the word hydracid, in which the electro-positive radical is made to act as if co-ordinate with oxygen.

Moreover, the termination in *ide* having been generally attached to the electro-positive compounds of oxygen, acting as bases, I condemned the employment of that termination, to distinguish the electro-negative, and acid compounds of sulphur, selenium, and tellurium. I considered it inconsistent to give precedence to the syllable designating the radical in the acids formed with hydrogen; as in hydrochloric, hydrobromic, hydriodic, hydrofluoric, hydrofluoboric, hydrofluosilicic, preferring the terms chlorohydric, bromohydric, iodohydric, fluohydroboric, fluohydrosilicic, &c., in which I have been sanctioned by THENARD and others.

I proposed a definition of an acid, and a base, which I conceived to be the only one which could be adopted, consistently with the use made of those words by BERZELIUS, and other distinguished chemists; and advanced that, agreeable to that definition, his double haloid salts must be considered as *simple* salts, severally formed of an acid and a base.

I objected to his treating the words combustion, and oxygenation as synonymous.

Having thus made the reader acquainted with the substance of my criticisms upon the BERZELIAN nomenclature, I will subjoin his letter in answer to them, and will then state, and endeavour to justify, the conclusions at which I have arrived.

Letter from J. J. BERZELIUS *of Stockholm to* R. HARE, M. D., *Professor of Chemistry in the University of Pennsylvania, acknowledging the receipt of a communication respecting Nomenclature, and replying thereto.*

STOCKHOLM, *September 23d*, 1834.

Sir—I am very much obliged to you for the remarks, which, under the date of June 21st, you had the friendship to communicate to me, respecting the nomenclature which I have employed in my Treatise of Chemistry.

I perceive that having contemplated chemical phenomena under different points of view, we differ as to the nomenclature which is the most appropriate for their description. I consider the combinations of metals with chlorine, bromine, &c., as salts; whilst you, in accordance with Mr. DE BONDSDORFF, consider them as bases and acids, capable of forming salts by their union.

If it were expedient that chemical classification should be dependent on the number of simple bodies which enter into each combination, this idea of Mr. DE BONDSDORFF would without doubt be preferable; but if attention be due to the chemical properties which characterize combinations, we cannot adhere to an arrangement founded on the number of the elements. Yet so essential is it in chemistry to have reference to properties, that a system of chemistry in which common and analogous properties should not affect the arrangement, would present a mass of facts so chaotic, that no memory would be competent to retain them. In a system thus strictly conformable to the ideas of Mr. DE BONDSDORFF, cyanogen, though in its properties resembing chlorine or bromine which are simple bodies, ought to be considered, also, as a base or as an acid having azote for its radical—I am persuaded you would not approve of extending the system of DE BONDSDORFF so far; but if it be correct, it would be inconsistent not to make this extension.

But let us return to the combinations of the metals with chlorine, fluorine, &c., and make, in imagination, the follow-

ing experiment. Let us take two portions of caustic potash, a base in which the *basic* characters are more striking than in any other. To one, let us add a sufficiency of sulphuric acid to extinguish entirely its *basic* property; we shall then have a neutral body of a saline taste. You will admit it to be a salt. Now let us add to the other portion, hydrofluoric acid. At a certain point the *basic* properties of the potash will disappear, and we shall have a resulting compound quite as neutral as the sulphate of potash, endowed with a saline taste entirely analogous to that of the sulphate. The basic properties of the potash are destroyed by the hydrofluoric acid, as well as by the sulphuric acid. But you will allege the resulting combination is not a salt, but a base which has exchanged one basifier (oxygen) for another basifier (fluorine.) In proof you may add as much more hydrofluoric acid, which combining with the new base will form with it a crystallized salt. But this salt is not neutral, it has almost the same acidity of taste as the hydrofluoric acid employed. The new base does not destroy then the acid reaction.

Let us make a further addition of sulphuric acid to the sulphate of potash. A salt equally acid will result, in which the sulphate of potash acts the same basic part towards the sulphuric acid, as the fluoride of potassium towards the hydrofluoric acid. Should it be desired to extend the comparison further, it will be found that for each less electro-positive fluoride, susceptible of combination with the potassic fluoride, there will be, with but very few exceptions, a corresponding sulphate, susceptible of combination with the sulphate of potash. The analogy is then complete, it exists not only in the perfect neutrality of the two potassic salts, in their saline taste, but also in their manner of forming combinations with other bodies; notwithstanding one of them, the sulphate, contains one element more than the other. If, instead of potash, potassium were employed to saturate our two acids, the analogy of the operation in both cases, would be still more complete. The same quantity of metal, would displace equal volumes of hydrogen. When the visible results of our ex-

periments are so perfectly analogous, it is to be presumed that the invisible process which we do not see, may also be perfectly analogous, and that if facts exactly alike are explained differently, there must be a defect in the explanation. If, for instance, the true electro-chemical composition of the sulphate of potash should not be $KO+SO^3$, as is generally supposed, but $K+SO^4$,* and it appears very natural that atoms, so eminently electro-negative as sulphur and oxygen, should be associated, we have, in the salt in question, potassium combined with a compound body, which, like cyanogen in $K+C^2N$,† imitates simple halogen bodies, and gives a salt with potassium and other metals. The hydrated oxacids, agreeably to this view, would be then hydracids of a compound halogen body, from which metals may displace hydrogen, as in the hydracids of simple halogen bodies. Thus we know that SO^3, that is to say, anhydrous sulphuric acid, is a body whose properties, as respects acidity, differ from those which we should expect in the active principle of hydrous sulphuric acid.

The difference between the oxisalts, and the halosalts is very easily illustrated by formulæ. In K|FF—fluoride of potassium, there is but one single line of substitution, that is to say, that of K|FF, whilst in KOOOOS (sulphate of potash) there are two, K|OOOOS and KO|OOOS of which we use the first in replacing one metal by another, for instance, copper by iron; and the second in replacing one oxide by another.

I do not know what value you may attach to this deve-

* In the Berzelian symbols, K stands for kalium, or potassium, S for sulphur, O for oxygen, and O^3 for three atoms of oxygen, O^4 for four atoms of oxygen.

† That is to say, if the salt called sulphate of potash, be considered as compound of potassium, and a quadroxide of sulphur, instead of being viewed as a protoxide of potassium, or potash, and tritoxide of sulphur, or sulphuric acid.

This is the formula for cyanide of potassium, consisting of potassium, K, and cyanogen, or two atoms carbon and one of nitrogen, C^2N.

lopement of the constitution of the oxysalts (which applies equally to the sulphosalts and others): but as to myself, I have a thorough conviction, that there is therein, something more than a vague speculation; since it unfolds to us an internal analogy in phenomena, which, agreeably to the perception of our senses, are externally analogous. If these phenomena are to be considered agreeably to the ideas of Mr. De Bondsdorff, how does it happen that sulphur, phosphorus, arsenic, and other radicals of the strongest oxacids, when united with chlorine, bromine, iodine, &c., do not combine with the chlorides,* bromides, &c., of the metals of the alkalies and of the earths; whilst the chloride and bromide of potassium combine easily with those of magnesium, iron, and manganese. Should then the chloride of magnesium, or that of manganese, be a stronger acid than the chloride of sulphur, or chloride of phosphorus? How is it consistent with these ideas that we can obtain crystallized salts as well with, as without water, of combination, composed of chloride of calcium and of oxalate, or of acetate of lime? Should the oxysalt be here the acid, or the base? I have now displayed to you, the considerations which have guided me, and which I think are not destitute of foundation.

I cheerfully admit that it would be preferable to employ the word chlorohydric, instead of hydrochloric. My motive for retaining this last, is, that I have ventured to propose a new nomenclature in a language foreign to me, in which it was inexpedient to make changes which could be avoided without inconvenience. I also agree with you, that we ought not to use combustible and oxidable, as having the same meaning. I have deserved your strictures for this inconsistency in my language; but I must suggest as an apology, that the two words were formerly used as synonymous, and that the work, in which you have recently noticed this oversight, was first published in 1806, having been from time to time

* I have translated chlorure, fluorure, bromure, by chloride, fluoride, and bromide, agreeably to the practice of the British chemists.

remoulded for new editions, without its having been possible to eradicate all that has not kept pace with the progress of science.

Accept the assurance of my perfect esteem, and of the sentiments of sincere friendship with which I have the honour to be, Yours, &c.

An Examination, by the Author of this Article, of the Suggestions in the preceding Letter of BERZELIUS, *and how far the Objections made to his Nomenclature, are therein answered.*

So far as my strictures were founded on the alleged difficulty of defining the terms acid, salt, and base, in any mode consistent with his classification, they are not met by any facts or reasoning in the much esteemed letter of my illustrious correspondent. The impracticability of defining a salt, he does not deny; and with great candour he admits that, in his definition of acidity, he has not been consistent. He concedes that it would be preferable to give the syllable, indicating the electro-negative ingredient, the precedence, as nothing but unwillingness to innovate, prevented him from pursuing that course.

He acknowledges that as combustion, in many instances, takes place without the presence of oxygen, the application of the word combustible, should not be confined to bodies which are susceptible of oxydizement.

My definition of acidity was as follows:—

"*When, of two substances capable of combining with each other so as to form a tertium quid,* and having an ingredient common to them both, one prefers the positive, the other the negative pole of the Voltaic series, we must deem the former an acid, and the latter a base. Also all substances having a sour taste, or which redden litmus,*

* This term *tertium quid* has been used by chemists, more formerly than of late, to designate a compound resulting from the union of two bodies, but in its properties resembling neither.

must be deemed acids, agreeably to usage." This definition I would now amend by leaving out the last sentence, and substituting therefor, the following: *Also when any substance is capable of forming a tertium quid with any acid or base agreeably to the preceding definition, it must be considered as an acid in the one case, a base in the other.* The definition, thus amended, takes in the organic acids and bases. In the form in which it was at first proposed, it has not been alleged defective by BERZELIUS; but he has striven to show an incongruity in the attributes of his double salts, when contrasted with those resulting from the union of some of the acids and bases of his amphigen class; which incongruity is, in his opinion, a sufficient reason for not considering them as *simple* salts, and their ingredients as acids and bases, agreeably to the opinions of DE BONSDORFF and myself.

BERZELIUS errs in confounding my opinions with those of DE BONSDORFF. However I may have admired the sagacity with which that chemist investigated the pretensions of some haloid salts to certain attributes of acidity or alkalinity; in my letter on the BERZELIAN nomenclature, I signified my unwillingness to rest my opinions upon a basis so narrow, as that which he had endeavoured to establish. I stated that I did not deem it necessary to appeal to his excellent observations, proving certain attributes of acidity to exist in one case, those of alkalinity in the other. I alleged my definition to be founded on the conviction that the property of affecting vegetable colours, on which that sagacious chemist lays so much stress, has not, latterly, been deemed necessary in acids; and that in bases it never was required. As respects them, it only served as a mean of subdivision between alkaline oxides and other oxibases.

I am at a loss to discover in what part of my letter there was any language which could convey the erroneous impression, that, in defining acids and bases I proposed to overlook properties, and to be regulated by attention to the number

of atoms in a compound. Certainly nothing was more foreign to my thoughts.

It is assumed by BERZELIUS that the saturation of the fluobase of potassium by fluohydric acid, cannot be considered as analogous to the saturation of the oxybase of potassium by sulphuric acid; because the resulting compound is to the taste in one case neutral, in the other sour. In reply I suggested that if the salidity of the biborates and bicarbonates was not to be questioned on account of their alkaline taste, nor that of the protochloride of tin on account of its sourness, it was not consistent that the pretensions to salidity of the fluohydrate of the fluobase of potassium should be denied on account of its sour taste. I will now add that if the fluosilicate of potassium be a double salt, the fluoride of silicon one of its two constituents must be a simple salt, and yet it is sour. If a simple salt may be sour, why may not a double salt have this attribute; and how in fact can its presence be inconsistent with salidity? Is not the absence of this characteristic in silica and tannin, and many other acids, as much against their claims to acidity, as its presence in other compounds is an objection to their association with saline bodies. It is considered by BERZELIUS an objection to the views which I have espoused, that the halogen bodies, while forming acids with various metallic radicals which oxygen does not acidify, do not form acids with sulphur, phosphorus, and arsenic which oxygen does acidify; yet what is there in this, more difficult to reconcile with the established results of chemical combinations, than in the fact that oxygen forms with sulphur, phosphorus, and arsenic, strong acids, with hydrogen water; while with hydrogen the halogen bodies all form compounds which BERZELIUS describes as having the highest pretensions to acidity. The highly active acid properties of the fluorides of boron and silicon, would lead us to expect similar compounds to be formed by the same radicals, with the other halogen bodies, contrary to experience. Chemistry makes us acquainted with many similar discordances. How is it that oxygen forms aëriform compounds with an extremely fixed body in the instance of

carbon; while in that of phosphorus or arsenic, both volatilizable, it forms acids which are comparatively insusceptible of volatilization? Wherefore does not hydrogen produce an acid with phosphorus and arsenic, as well as with sulphur?

According to BERZELIUS, all the halogen bodies produce with hydrogen combinations which are as highly endowed with the attributes of acidity, as the strongest acids into which oxygen enters as a constituent. It is conceded in his letter that his language respecting these combinations cannot be reconciled with his declaration in one place that they do not combine with oxybases, and in another that a body which cannot so combine is not an acid. It strikes me, that the only way in which the admitted inconsistency of his description of these bodies, with his definition of acidity, can be avoided, is by assuming that they combine as acids with haloid bases, although decomposed by oxybases.

I will now proceed to comment on a new subject for consideration, presented in BERZELIUS's letter in reply to mine.

It must be evident that every oxysalt, composed of an oxacid and an oxybase, must consist of an atom of each radical, and as many atoms of oxygen as exist both in the acid and in the base. Thus sulphate of potash consists of an atom of potassium, an atom of sulphur and four atoms of oxygen, and may be represented either by SOOO KO or SOOOOK.

BERZELIUS in his letter repeats an ingenious suggestion previously advanced in his treatise, that SOOOO, (sulphur with four atoms of oxygen,) may act, as a compound halogen body like cyanogen, and thus form a salt by union with an atom of any radical. He conceives that the apparent want of analogy, which induced him to separate into two classes, the amphigen and halogen bodies, disappears under this view of the phenomena; and that his amphide salts might be considered as constituted of a compound halogen body and an elementary radical. But however we may admire the ingenuity of these suggestions, ere, in obedience to them, we extend the limits of the halogen class, I would request that the word salt should be defined, and that it be shown that consistently

with any definition which can be devised, there is any class of bodies in nature which merit the appellation of salt-producers. Before enlarging the superstructure, let it be shown that the basement has been well grounded.

Berzelius lays some stress on the community of effect, in the evolution of hydrogen, both by acids formed by hydrogen with halogen bodies, and by diluted hydrous sulphuric acid, as evincing a similitude of composition justifying the suggestion above quoted from him. But I conceive that this common result is better explained by ascribing it to the tendency of radicals to displace each other from combination, whether existing in a simple or a complicated compound. If water exists as a base in hydrous sulphuric acid; as I have elsewhere suggested, we may consider this hydrous acid as a sulphate of the oxybase of hydrogen; and that when it reacts with zinc or iron, the proneness of hydrogen to the aëriform state enables either metal to take its place, agreeably to the established laws of affinity.

It may be proper, before concluding, to explain more particularly the nomenclature which I have adopted.

The amphigen, and halogen bodies of Berzelius, as they produce acids and bases according to my definition, are all classed as basacigen bodies. Of course oxygen, chlorine, bromine, iodine, fluorine, cyanogen, sulphur, selenium, and tellurium, are included in this class.

The general designation of a binary compound of a basacigen body, is the termination in *ide;* the special, the termination in *acid,* when the compound acts as an acid, in *base,* when it acts as a base.

Hence an oxide, may be an oxacid, or an oxybase;

a chloride,	a chloracid,	or a chloribase;
a bromide,	a bromacid,	or a bromibase;
an iodide,	an iodacid,	or an iodobase;
a cyanide,	a cyanacid,	or a cyanobase;
a sulphide,	a sulphacid,	or a sulphobase;
a selenide,	a selenacid,	or a selenibase;
a telluride,	a telluracid,	or a telluribase;

Compounds which consist of radicals only, are distinguished by the term *uret* equivalent to the French *ure*. Hence *carburet, phosphuret, boruret, silicuret, &c.*

Of any two binary compounds containing each the same basacigen body and forming one compound, the more electro-negative is an acid, the other a base. Hence all the electro-negative haloid compounds in the BERZELIAN double salts, are acids, and the electro-positive, bases. Where there are two such compounds one containing one basacigen atom, the other two atoms or one and a half, the former has a termination in *ous*, the latter in *ic*. As for instance the *chlorureplatinoso-potassique* of BERZELIUS, is a compound of *chloro platinous acid*, and the *chlorobase of potassium*, and is the *chloro-platinite of potassium*. The *chlorureplatinico-potassique* of the same author, is the *chloroplatinate of potassium*.*

By analogy the intelligent reader may easily make these examples a clue to designate any other of the double salts of BERZELIUS so as to accord with the plan in question. He may have a *bromoplatinate* or *bromoplatinite*, a *iodoplatinate* or *iodoplatinite*, a *fluoplatinate, &c.*; or changing the radical a *chloroaurate* or *chloroaurite*, a *bromoaurate* or *bromoaurite &c.*

The terms amphigen and halogen being employed both from expediency, and in honour of their author, we may use his terms haloid and amphide, to distinguish the acids or bases severally formed by these classes, the abbreviations *halo* and *amph*, being employed in composition. Thus I designate the

* In designating salts of the metals proper, as for instance, the *nitrate of mercury;* the idea of the oxydisement of the metal is always understood, although usually not expressed. In the instance above cited, we actually mean the *nitrate* of the *oxide*, or *oxybase* of mercury. By analogy, I here use the term *chloroplatinate of potassium*, for *chloroplatinate* of the *chlorobase* of *potassium*. It is in fact, well known to Chemists, that acids do not unite directly with metals. The only alleged exception to this rule, of which I have any knowledge, is that of tellurium and sulphuric acid. It is inferred, therefore, that when an acid is combined with a metal, the latter must exist in the state of a base formed with the basacigen body which enters into the composition of the acid.

acids formed by the halogen bodies with hydrogen, as halohydric acids; those formed with that radical by the amphigen bodies, as amphydric acids. As the same radical will in other cases be found to form acids with several of the halogen bodies, platinum for instance, the acids thus produced, may be called haloplatinic acids; or if gold were the radical, they would be called haloauric acids. These examples will suggest to the chemical reader a series of names, as for instance *haloargentic, halocupric, halostannic, halopalladic.*

I consider prussian blue as a cyanoferrite of the cyanobase of iron, or briefly a cyanoferrite of iron. The diversity of properties which enables two cyanides of iron to exist in combination in this cyanoferrite, one as an acid, the other as a base, is one among many other instances in which compounds constituted of the same elements in the same ratio, have different properties, and are said in consequence to be *isomeric*, or to afford cases of *isomerism.*

The salt designated by BERZELIUS as the "*cyanure ferroso-potassique,*" is the well known test for iron heretofore called ferroprussiate of potassa; under the idea that it consisted of prussic acid, iron, and potassa. As the prussic acid was viewed at the same time as a compound of hydrogen and cyanogen, the ferroprussic acid was considered as a compound of cyanogen, hydrogen, and iron. According to BERZELIUS, the supposed *ferroprussiate* is a compound of a "*protocyanure*" of iron, and a "*cyanure* of *potassium;*" each being a simple haloid salt, and the aggregate a double "*cyanure.*" Agreeably to my nomenclature, the "*protocyanure*" of iron is considered as cyanoferrous acid, and the "*cyanure*" of potassium as a cyanobase; the aggregate being a cyanoferrite of the cyanobase of potassium, but designated briefly as a cyanoferrite of potassium.

I infer that the "*ferroprussic*" acid is analogous in constitution to the triple compound of fluorine, silicon and hydrogen, improperly called hydrofluosilicic acid; and that, consistently with the hypothetical views under which the latter received its name, the former should be called hydro-

cyanoferric acid. Even admitting the correctness of the hypothetical impression, to which I have alluded, agreeably to which such compounds are acids with a double radical, I urged that the appellations of such compounds should be so altered as to give precedency to the electro-negative ingredient. Hence the one would be called cyanohydroferric acid; and the other, fluohydrosilicic acid. But in my letter to SILLIMAN, already cited, I advanced a new hypothesis respecting the constitution of the fluohydrosilicic, and fluohydroboric acids. I suggested that they should be considered as compounds in which the fluorides of silicon or boron acted as acids, the fluoride of hydrogen as a base. Consistently with that doctrine, I would consider the *protocyanide* (or "*cyanure*") of iron in the alleged *ferroprussic acid*, as acting as *cyanoferrous acid*, the *cyanide* of *hydrogen* (*prussic acid*) as a *cyanobase* forming, by their union, a cyanoferrite of hydrogen.

As compounds, consisting of a basacigen body, hydrogen and a radical, do not, when presented to bases, enter into combination; but are, on the contrary, decomposed so as to allow another radical to take place of their hydrogen, it is inconsistent with chemical law, as stated by BERZELIUS,* or my definition of acidity, (page 9,) to designate them as acids.

I have called the electro-negative "*protocyanure*" of iron of BERZELIUS, cyanofer*rous* acid, because there is "sesquicyanure" in the *cyanureferrico-potassique*" of that author, which, by analogy with the nomenclature of the oxacids, is entitled to the appellation of cyanoferric acid.

* Traite, page 41, vol. ii.

ART. II.—NOTES ON FALSIFICATIONS AND ADULTERATIONS.

No. I.

THERE is no species of fraud so criminal as that, which, prompted by a sordid desire after "filthy lucre," cheats mankind out of life or health. It cannot be denied that this evil is rapidly increasing, and perhaps as much so in the department of Pharmacy as in any other. In this state of things the question naturally occurs, whether it be not the *duty* of the honest pharmaceutist and physician to do all that single or combined efforts can accomplish to protect the community from its effects. The Philadelphia College of Pharmacy has, at one time or another, taken up the subject, and the pages of its Journal will testify to the zealous endeavours of its members to raise the moral character of the profession, and purify the drug market from some of its most obvious pollutions. But their researches and expositions, except within the precincts of their own body, have scarcely been sufficient even to keep pace with the "natural increase;" and it would almost appear that we have become at length discouraged from any further contention against this many-headed monster. But it cannot be supposed that the College of Pharmacy will really sit still, and quietly look on the progress of that evil, the prevention of which was one of the main objects of its institution. Its members have almost daily before their eyes instances of adulteration or falsification, the detection of which, if brought into public view, would produce a powerful and salutary effect; and it is with the view of affording a channel for the exposure of these frauds, that I have ventured to commence the present series, in the hope that my fellow members will promptly aid in the attempt. I would invite

intelligent pharmaceutists generally, to keep notes of all such instances of adulteration and falsification as may from time to time fall under their notice, and send them for insertion in this Journal. By this means we may eventually obtain a body of as useful information, respecting the corruptions existing in our own drug and chemical market, as the valuable work of Bussy and Boutron-Charlard embraces with regard to those of France.

Balsam of Fir.—A druggist of another city offered us an article under this name at such a price as to excite suspicions respecting its quality. On inspection and inquiry it appeared to be Chio Turpentine, the resin of the Pistacia Terebinthus, and not of the Pinus Balsamea. It is of a deeper colour than the true Canada Balsam, and of a stronger smell. It is put up in bottles similarly to the genuine article, which it pretty closely resembles.

Iodine.—A lot of Iodine, purchased some months since, appeared very partially soluble, and was found to contain a considerable proportion of powdered coal. The coal had been powdered rather coarsely, and the impalpable portion sifted out and rejected, leaving it in particles about the twentieth of an inch in diameter, which were readily merged in the mass of the Iodine. No note was taken at the time, either of the proportion of the adulteration, or of the country whence the Iodine was imported.*

Potassæ Citras.—We imported from London a few months ago an article under this name, which we supposed of course to be an actual combination of potassa and citric acid. It was found, however, to be a mere *mixture* of bicarbonate of potassa with the powdered acid and an agreeable proportion

* Since writing the above, I observe a similar adulteration of Iodine mentioned by Bussy & Boutron-Charlard as having been detected by Chevallier.

of sugar,—all the ingredients having been well dried to prevent combination. The mere solution of it in water, which was accompanied by an evolution of carbonic acid, formed a most agreeable diaphoretic medicine; but it is obvious that the article was not entitled to the name by which it was sold, the quantity requisite to produce a certain effect on the system being much and uncertainly larger than that of the citrate of potassa, inasmuch as an unknown proportion of its weight was sugar and carbonic acid.

Benzoic acid.—I bought, a few days ago, 2 lbs. of "benzoic acid" from a manufacturer, who stated in strong terms his determination to make none but *pure* chemicals. The sample from which I ordered it, was apparently a beautiful article, and at a rather lower price than is generally demanded. The acid when brought was declared to be perfectly pure. My attention was soon afterwards directed to it by B. F. Hoeckly, an apprentice in our establishment, who, in bottling it up, found it full of gritty particles of a sweet taste, which he suspected to be sugar. On examination, by attempting the solution of two separate portions respectively in *cold* water, and in highly concentrated alcohol, I found that it contained 50 *per cent.* of powdered white sugar. The alcohol dissolved the true acid, leaving 50 *per cent.* of sugar insoluble in that menstruum; and the water, which was of a winter temperature, dissolved the sugar of the other sample, leaving an equal quantity of true benzoic acid, which was separated by filtration. This purchase, which was our first, was of course also our last transaction with the house in question.

Antimonii oxidum.—This oxide, besides its medicinal uses, is sometimes used as a colouring matter for enamel painting. A manufacturer of porcelain teeth lately complained of the quality of some which we had ourselves imported from London last year. He suggested that it must be adulterated, as it would not produce the colour desired. It had

the dirty yellowish white appearance of the true oxide; but on examination we found that it effervesced by the addition of a strong acid. I accordingly submitted 100 grains to a more strict investigation. Muriatic acid was added until the evolution of carbonic acid ceased. The mixture was diluted with water, and filtered. The portion remaining on the filter, when dried, weighed 70 grains, and proved to be real oxide of antimony. To the filtered solution was added a solution of oxalate of ammonia until it ceased to act. The precipitate thus formed, which was oxalate of lime, was washed and dried, and weighed 42 grains. As oxalate of lime consists of one atom of the acid, (= 36) united to one of lime, (= 28) and one of water, (= 9) and as carbonate of lime is composed of one atom of lime and one of carbonic acid, (= 16) the above quantity of 42 grains of precipitate indicated an adulteration of nearly 29 grains, or, (allowing a little for loss,) say 30 *per cent.* of carbonate of lime. It is scarcely needful to add that this result suggested the propriety of subjecting the whole of what remained of this imported article to ablution by dilute muriatic acid.

Wm. Hodgson, Jr.

Philadelphia, 2d mo. 20, 1837.

ART. III.—CAPSULES OF GELATIN.

(*Capsules Gelatineuses; Dublanc et Mothes, a Paris.*)

By Alfred Guillou, Graduate of Phil. Coll. Phar.

There are many medicines whose administration would in numerous cases be productive of very beneficial effects, were it not absolutely prevented by their strong or disagreeable taste. Of this class are the turpentines and many of the gum resins, oil of croton, creosote, &c. &c., and last, though by no means least, the balsam copaiba. Notwithstanding the many ingenious formulæ adopted for the purpose of concealing the odour or disguising the nauseous taste of this latter drug, there

are many cases in which these being but imperfectly accomplished its use is necessarily prevented. The gentlemen above named are certainly entitled to the credit of having invented the most ingenious and best devised mode of administering this medicine, in the way indicated by the title of this article. Having observed that their "*capsules*" of balsam copaiba produced the effects desired, from the use of that remedy, and that they were taken by the patient without any nausea or repugnance, I was immediately struck with the propriety of the suggestion made by the inventors, that these capsules could advantageously be employed in the administration of various other pungent or disagreeable medicines, and for this purpose might readily be kept on hand by our apothecaries, to be filled with such articles and in such doses as physicians' prescriptions might from time to time direct. Under this conviction, I instituted a number of experiments, from which I have learned the mode of manufacturing the "capsules," which I now proceed to detail, and it may not be amiss to state that so close was the imitation and so nearly does the article manufactured according to the following process resemble the imported, that many of those made by me were sold as French, by dealers who purchased from me. Believing that this mode of administering the balsam referred to, and of applying the most acrid medicines to the interior stomach without disagreeably affecting the mouth will naturally supersede all others, I take great pleasure in submitting it for publication in the Journal.

The apparatus necessary for manufacturing the article in question, is certainly not extensive and by no means costly. Provide a suitable number of narrow tin dishes, about eighteen or twenty inches in length, half an inch in depth, and about two inches in width. In the length of these, and in a line, plant or solder at the distance of one inch from each other a number of smoothly turned metallic knobs of an ovoid shape, whose apex, having been somewhat lengthened out, forms a thin neck by which they are attached to the tin dishes. This

neck may be of about half an inch in length. Procure a sheet of tin, and perforate it with round holes, of which the diameter will be equal to the thickness of the knobs. Having greased the knobs well with lard, so as not only to prevent any adhesion to them, but also the adhesion of the inner sides of the capsules to each other after casting, pour melted glue (the most transparent having been selected) upon them and allow it to become tolerably stiff. If you think the shell is too thin, a second coat may be poured over the first. The capsule having been thus cast is allowed to cool down to about the consistence of common india rubber, and, having run a knife around the neck, you twist it briskly around and pull it upwards off from the knob. *It will immediately collapse and lose the form imparted to it on the mould, but if laid aside to dry, will by the time it has hardened have regained the desired rotundity.* Place it upon your perforated tin or "filler" and you can thus conveniently fill it with the article prescribed. A small piece of moistened goldbeaters' skin serves to cover the opening, and is easily concealed by the application of a thick coat of a solution of gum arabic with a camel's hair pencil. This last part of the operation being intended solely for the "finish" of the article, is only necessary in those cases where it is proposed to keep a supply on hand already filled, and need not be adopted where the immediate use of the remedy dispenses with any necessity of so rigidly consulting appearances.

SELECTED ARTICLES.

ART. IV.—NOTE UPON THE DISTINCTIVE CHARACTERS OF CALISAYA BARK. By M. Guibourt.

At the last meeting of the Society of Pharmacy, I presented on the part of Mr. A. Delondre a specimen of bark, in large broad flat pieces, which to a certain extent resembled the Calisaya, but which furnished when manufactured, only two drachms of sulphate of cinchonia, and no sulphate of quinia. Upon the present occasion I think it will be useful to review the characters belonging to the true Calisaya bark.*

It may be covered with the exterior *crust*, or be deprived of it, which circumstances are designated in commerce by the terms Calisaya with the peel, *(Calisaya en ecorce)* and peeled Calisaya *(Calisaya monde'.)*

That with the peel (epidermis) is obtained both from the young and old branches and from the trunk. In the first instance the epidermis is thin, very rugose, hard, often of a grayish colour externally, but brown internally. It is deeply furrowed longitudinally and more especially so transversely, and when detached from the liber, which is frequently the case, it still leaves deep transverse impressions which corres-

* It ought to be written Colisalla, as Laubert has remarked in the Bulletin de Pharmacie, T. II. p. 302. There does not exist a province of Peru named Calisaya, which has given its name to the bark, as has been supposed upon the faith of a celebrated traveller. According to Dr. Poeppig, whose memoir upon the Huanuco barks I will probably soon publish in French, colla means remedy, and salla means a country full of rocks.

pond to the fissures in the part removed. In contradistinction to the preceding characters, every bark of which the cortical portion is shining, not rugged, not marked with numerous transverse fissures, is not true Calisaya, and ought to be considered unfit for the manufacture of sulphate of quinia. By this mode of distinction, the younger portions of the barks which I have described under the names *orange yellow, (Q jaune orangé,)* or *light Calisaya (Calisaya leger,) the Columbia bark (Quinquina de Columbie,) the white bark of Loxa (Q. blanc de Loxa,) Carthagena bark (Q. Carthagene,)* and Cusco bark *(Q. de Cusco,)* will be excluded.

It is very difficult to indicate in writing, the differences which distinguish the young Calisaya with the epidermis from Loxa and Lima barks, and from the red bark destitute of warts. The latter, however, is easily recognised by the marked red colour of its liber, and it commands so high a price, as to induce little fear that it may be substituted for Calisaya. As regards the two first, they are recognised by their epidermis, which is more uniform and less deeply cleft, and by the greater degree of adhesion between this portion and the liber, which is less fibrous, more compact, with the fracture often short and resinous. Their taste is both astringent and bitter, while the Calisaya has always an extremely fibrous fracture and a very bitter taste, with little astringency. Finally the test, by the sulphate of soda which I have pointed out, can allow of little doubt. This test consists in coarsely pulverizing a small quantity of the bark, triturating the powder in a porcelain mortar with water so as to form a liquid pap, and then filtering. Upon adding a few crystals of purified sulphate of soda to the filtered liquid, an abundant white precipitate is formed with the Calisaya bark, while no pale bark possesses this property.

When the Calisaya bark is obtained from the large branches or trunk of the tree, the epidermis is thicker, even sometimes as much as an inch in thickness. It is still more rugose and more deeply cracked, but the furrows do not penetrate to the liber, which no longer exhibits the circular

impressions perceptible upon the younger pieces. The epidermis is formed of laminæ applied one upon another, of a *deep brown colour*, containing between them a *reddish* pulverulent substance, intermixed with white fibres. It must here be remarked that the colour of the laminæ is deeper than that of the interposed pulverulent matter, because this character distinguishes the Calisaya, in large unpeeled pieces, from all others. Thus the wartless red bark in flat pieces, apart from the red colour of its liber, resembles to an astonishing degree, the unpeeled flat Calisaya; but the epidermis is formed of grayish laminæ which enclose a pulverulent substance of a bright red colour, and the bark presented by M. A. Delondre, which is a kind of ligneous Columbia bark, is provided with an epidermis formed of micaceous white laminæ, containing a red pulverulent substance, and where this substance is wanting, the liber is simply covered with a thin white micaceous layer, which is entire and without fissures. This bark ought to be pointed out to pharmaceutists, because skilful dealers, who pretend to pass for honest men, colour it red, either by a weak alkaline solution, or with an infusion of logwood, and pass it for red bark. We have seen such an article in the possession of a number of pharmaceutists during the past year.

It now remains for me to speak of the peeled Calisaya bark. The best is that which is quilled, compact and heavy. That which is in large flat pieces is of an inferior quality. In addition, this bark is always very fibrous, of uniform texture, and in every part of a yellow colour. Its external surface is angular, or as it were, compressed irregularly. Every kind of bark which exhibits a more fibrous texture internally than externally, which is marked with two distinct colours, a whitish hue internally and a reddish tint externally; finally, every kind which presents a well defined, uniform, regular exterior surface, is to be suspected. Such a variety of bark may, however, be extremely active as a medicine, and contain much of the alkali. Such are those justly esteemed which I have de-

scribed under the names of orange yellow, and Columbia barks. (Hist. abrég. des drog. simpl., nos. 489 and 490) ; but this alkali consists in a large proportion of cinchonia, and these barks are of little value in the manufacture of sulphate of quinia. I finish this note by a passage extracted from a letter of Mr. Christison, Professor of Materia Medica, at Edinburgh, the publication of which may be agreeable to the friends of natural science.

"You have long since, I doubt not, arrived at the conclusion, that notwithstanding the travels of many scientific men, we have as yet but few positive data with regard to the species which furnishes the most valuable bark, and you think, perhaps with me, that naturalists have placed too much reliance on their collectors of plants. A young accomplished botanist, named Gardiner, a pupil of Mr. William Hooker, of Glasgow, has just proceeded to South America, and proposes to remain some time in the bark forests. I had an opportunity of conversing with him previous to his departure, and I strongly impressed upon him, not to trust to specimens obtained second hand. He has promised to collect himself all sorts of botanical specimens and barks, and to make his researches upon this subject so complete, as to be able to come at positive results. He has engaged to make known his progress through Mr. Hooker, and it will give me great pleasure to communicate it to you. It may be as well to add, that Mr. Gardiner proposes to defray the expense of his travels, by furnishing the cabinets of naturalists with specimens at a moderate price. So that if there should be any persons or societies in Paris to whom they will be an object, the voyage of Mr. Gardiner will present the opportunity of obtaining them. I believe that the price will be sixpence for every species of plant, from South America, indifferently."

Journal de Pharmacie.

ART. VI.—ON NITRIC ETHER. By R. Hare, M. D., Professor of Chemistry in the University of Pennsylvania.

This ether may be obtained in a diluted state, by distilling alcohol with diluted nitric acid, or with nitre and sulphuric acid. When sulphuric acid is used, the product is liable to consist in part of sulphuric ether.

Thenard informs us that to obtain pure nitric ether, equal parts of alcohol, and of the nitric acid of commerce, may be mixed and distilled with great caution, the product being passed into a series of Woulfe's bottles, the first empty, the others half-filled with brine, and surrounded by a freezing mixture. As soon as the reaction commences, it increases rapidly, so that it is necessary to check it by cooling the retort.

I subjoin an engraving and description of an apparatus which I have contrived for generating nitric ether.

I am of opinion that it would be advantageous, if the prescriptions of our physicians were made with reference to ingredients of a high degree of purity. The physician should know how much real nitric or sulphuric ether is contained in the diluted article which he directs his patient to use. Hence pure nitric or sulphuric ether should be prescribed, adding as much alcohol or water as he may deem necessary. Agreeably to the present practice, it is in the power of manufacturing chemists to impoverish ethereal preparations with little danger of detection.

Pursuant to the London Pharmacopœia, three ounces of nitric acid, by distillation with a quart of alcohol, are allowed to produce twenty-four fluid ounces of sweet spirit of nitre. According to Thenard, the quantity of ether, when the materials are in the ratio of equality, amounts to two-thirds of the weight of the acid. Hence it is probable that the quantity of ether in the twenty-four fluid ounces of sweet spirit of nitre, obtained as above mentioned, is not more than two ounces.

I infer that sweet spirit of nitre of a more uniform strength, would be obtained by the addition of alcohol to pure nitric ether, to an extent no more than adequate to render it soluble in water; and then adding water to the alcoholic solution until the ether should form only a twelfth of the aggregate. In a preparation thus made, the properties of the ether would not be unnecessarily associated with those of alcohol, as in the usual officinal preparation.

Process for Nitric Ether, or Sweet Spirits of Nitre, by means of an approved Apparatus.

The reaction of nitric acid with alcohol is so difficult to regulate, in the ordinary mode of making nitric ether in which the whole of the materials are mingled at the outset of the

process, that I was induced, about twelve or fifteen years ago, to introduce an apparatus in which they were gradually added together within a glass bottle, by means of glass funnels with glass cocks.

Subsequently I adopted the more simple apparatus represented in the accompanying figure.

Providing a bottle with three tubulures, let one tubulure communicate by means of a recurved tube A, with another tube passing perpendicularly through an open-necked inverted receiver C, and entering a bottle surrounded with ice and salt, occupying a suitable vessel B B. The cavity of the receiver should likewise be occupied by a freezing mixture.

Into each of the remaining tubulures let a glass tube be introduced, ground or luted to fit air tight, and tapering so as to terminate in a capillary orifice near the bottom of the bottle.

Through one of the tubes introduce as much alcohol as will cover the bottom of the bottle, and then, by means of the other tube, introduce as much strong nitric acid as will cause an effervescence. Should the effervescence threaten to become explosive, the reaction may be checked by the further addition of alcohol, and when the reaction appears to decline too much, it may be re-excited by an additional quantity of acid. By these means, without applying heat, a quantity of nitric* ether will soon be condensed in the refrigerated bottle. To convert this ether into a liquid, fully equal to the officinal sweet spirits of nitre, let it be mingled with seven parts of alcohol, and four of water.

The colder the freezing mixture, the greater will be the

* I incline to the opinion that this ether is a compound of etherine with the "*hiponitrous*" acid of the British chemists, consisting of three atoms of oxygen and one of nitrogen. This compound is by Berzelius called "*nitrous*" acid: as the name of this acid is doubtful, and as it is possible that new light may be thrown on the composition of this liquid, it appears to me inexpedient at this time to change the name by which it has for many years been known.

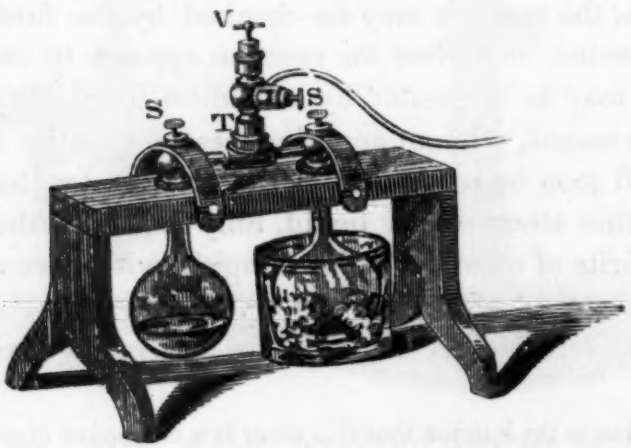
product; yet more or less may be obtained by refrigeration with cold water.

It may be proper to mention, that at the bottom of the phial an aqueous acid liquor is deposited, upon which the ether swims, and from which it should be carefully separated.

ART. V.—IMPROVED CRYOPHORUS. By R. Hare, M. D.

Professor of Chemistry in the University of Pennsylvania.

Two flasks, of which the necks have flanged orifices, are so secured in a wooden frame, that by the pressure of screws S S, and gum elastic disks, the orifices of a tube are made to form with them severally, air tight junctures. The orifices of the tube are furnished with brass flanges, which correspond with those terminating the necks of the flasks.



Midway between the junctures a female screw is soldered to the tube for the insertion of a valve cock V, by means of which, and a flexible tube extending to an air pump, the flasks may be exhausted, and then closed. A small quantity of water having been previously introduced into one of them, if, while

the exhaustion is sustained, the other flask be refrigerated by ice and salt, the water will be frozen.*

The intelligent chemist will perceive that this apparatus may be applied to the purpose of desiccation by placing the article to be dried in one receptacle, and quick lime, chloride of calcium, or concentrated sulphuric acid, in the other. The orifice of the receptacles may be made larger without inconvenience. Two large cylinders, for instance, may be used.

I propose, as soon as I have leisure, to apply the principle illustrated by this apparatus, to the distillation or desiccation of many substances which are liable to injury when exposed to heat, or air. I conceive that there is, by means of analogous apparatus, a fruitful field for improvement in the arts. I am of opinion that it may be employed in the preservation of meat, milk, fruit, vegetables, and the making of cheese; also in pickling and preserving.

In these processes it would remove the necessity of resorting to a high temperature to expel water, by which means the flavour of the fruit is injured.

* For the information of readers who may not be chemists, I subjoin the following explanation of the cause of the congelation of the water.

So long as no condensation is effected, of the thin aqueous vapour, which, when water is present, must occupy the cavity of the instrument, that vapour prevents, by its pressure, or tension, the production of more vapour: but when, by means of cold, the vapour is condensed in one bulb, its evolution in the other, containing the water, being unimpeded, proceeds rapidly. Meanwhile, the water becomes colder, and finally freezes, from losing the caloric which the vaporization requires.

According to Wollaston, one grain of water, converted into vapour, holds as much caloric as would, by its abstraction, reduce thirty-one grains from 60° F. to the freezing point; and the caloric requisite to vapourize four grains more, if abstracted from the residual twenty-seven grains, would convert them into ice.

ART. VII.—OF THE CALAGIRAH OR CALAGERI OF INDIA, VERMIFUGE SEEDS PREFERRED TO THE SEMEN CONTRA. By J. J. Virey.

There has been sent to us from Calcutta, under the denominations of Calageri, or Calagirah, some very small black seeds, which are bitter, of a slightly aromatic odour, and contain volatile oil; their form is polygonous, acute at their inferior extremities. We have determined them to belong to a plant of the family Compositæ, division *Corymbiferæ*, (*Synanthereæ*, of H. Cassini,) and *Syngenesia, Polygamia Superflua*, of Linnæus. It is an annual herb, about five feet in height, with a straight, cylindrical, striated stem, filled with medullary substance. Its leaves are alternate, oval, lanceolate, acute, largely dentate. The flowers are of a purplish colour, showy; supported on simple peduncles and terminate the stalk, they have ligulate calycine scales; the florets are hermaphrodite.*

This plant which on account of its properties enjoys great celebrity in the East Indies, has been placed in the genus *Conyza*, L. It has been figured by Van Rheede,† by Burmann,‡ and described by Vaillant.§ It has been cultivated in the Garden of Plants in Paris, and is susceptible of being acclimated in France. It is the *Vernonia anthelmintica* of Willdenow,‖ the *Ascaricida anthelmintica* of Cassini.¶

In effect this bitter plant has been recommended in decoc-

* *Conyza foliis lanceolato-ovatis, serratis, scabris, pedunculis unifloris, calycibus squarrosis.*

† *Hortus Malabar*, tom. 2, p. 39 plate 24. *Cattu-schiragam* of the Hindoos.

‡ *Thesaurus zeylanic*, p. 210, tab. xcv.

§ Mem. Acad. Sc. Paris, an. 1719.

‖ Cultivated in the green house, under this name, at the Garden of Plants, it flowers in September.

¶ This genus has also been adopted by M. Decandolle, Prodr. tom. 5.

tion, administered internally as a remedy for gout, or applied as external fomentations for rheumatism, &c; but it is the powdered seeds, which is said to be the best vermifuge for ascarides and lumbrici in children. They are also efficacious in flatulent colic; if an infusion be administered, it acts upon the kidneys, and is serviceable in cough. As it is much less disagreeable to take than the *semen contra*, we are of opinion that it ought to be substituted for it, and this substitution will be easy, as the plant can be naturalized in our gardens. It must, however, be guarded against frost.

ART. VII.—FALSIFICATIONS OF WINE VINEGAR AND THE MEANS OF DETECTING THEM. By A. Chevallier.

Having been charged in 1833, as a member of the Counsel of Health, with the examination of specimens of vinegar, obtained from the cantines of several of the barracks of Paris, I thought it obligatory upon me to make some investigation into the purity of the vinegar sold in Paris, and the means employed to adulterate it. I directed a poor woman to procure for me, from such grocers as I designated, a certain quantity of vinegar, and upon these specimens, in number an hundred and twenty, I made my experiments.*

* The experiments made in Paris upon the purity of vinegar, originated from the information, that a large proportion of the vinegar sold in the departments was made up by the addition of sulphuric acid. Prior to this, at the commencement of the year 1833, the Deputy Mayor of Nantes, charged with the municipal police, had been informed that a large quantity of vinegar then in use had been adulterated; an investigation of the matter was made by the commissaries of police assisted by members of the counsel of health, and 116 casks of vinegar were seized, and afterwards, in consequence of judgment given, the vinegar which they contained was poured out in the public street.

Of these 120 specimens, there were
97 of pure vinegar,
17 of vinegar altered by sulphuric acid,
3 of vinegar containing acrid substances,
2 of vinegar containing copper,
1 of vinegar containing lead.

Our researches induced us to believe, 1. that many of the falsifiers, who are extremely ignorant, are not aware that they commit a crime by mixing foreign substances with their vinegar; 2. that others, equally ignorant, have purchased recipes to render their vinegar stronger, believing that by following these recipes they improve their merchandize;* 3. that there are others who increase the amount of their vinegar by sulphuric acid, well aware of what they are about, with the design not only of rendering it stronger, but of enabling them them to maintain a competition and obtain ready sales by underselling the market. However this may be, and whatever may be the reasons which induce dealers to sophisticate the vinegar sold by them, it is to be desired: 1. that correct authoritative information, upon the means of recognising the falsifications of vinegar should be obtained and published; 2. that pharmaceutists, who from their position and the studies with which they are occupied, possess the requisite knowledge, should be requested to examine, not only the vinegar, but also all other substances supposed to be sophisticated; 3. that severe laws should be enacted, which will be able to take hold of those who become guilty of a crime which can endanger the public health.†

* The following recipe, bought by a seller, has been communicated to us, as employed successfully abroad to falsify vinegar.

℞. Cremor Tartar, 1 oz; Sulphuric acid at 50°, 2 oz. Boil in a glass vessel, allow the mixture to cool and settle, pour off the clear liquid, which is very sour. This liquid in the proportion of several drops to the bottle of vinegar increases its strength.

† We will advert here to the following circumstances; that, but a short time ago, bakers were in the habit of introducing in the preparation of bread a poisonous salt, *the sulphate of copper*, for the purpose of obtaining

While we indulge the hope that instructions upon this subject will be published, we are induced to believe we are occupied with a work of utility, by indicating the means to be put in practice to detect falsifications of this kind; it is our design to publish subsequently other articles upon sophistications not less dangerous, which have fallen under our observation.

Means of detecting the sophistication of vinegar by sulphuric acid.

This mode of adulteration can be traced back to a period somewhat distant, and different methods have been pointed out in order to detect it; the best of these is based upon the employment of the solution of the muriate of baryta. It consists in pouring into the vinegar supposed to be falsified and diluted with water, a portion of this solution, which causes a yellowish flocculose precipitate, little abundant if the vinegar contains no sulphuric acid, and an abundant white granular precipitate, if the vinegar contains this acid.*

The precipitate furnished by the sulphuric acid is weighty, it quickly falls down, is insoluble in water and in nitric acid, it is converted into the sulphuret of barium when heated with charcoal; this precipitate, collected on a filter and washed with boiling water, indicates by its weight the quantity of sulphuric acid requisite for its production, as it is known that 100 parts of sulphate of baryta contain 33.6 of sulphuric acid and 66.1 of protoxide of barium.

The following method may also be employed, although it takes more time; still it is preferable. Take 100 grammes of the vinegar to be tested, place it in a porcelain capsule, heat it moderately, so as to reduce by evaporation the liquid to an

a greater degree of whiteness!! 2. that at the time of the cholera and since, mealy substances obtained from cabbage and radish were substituted for mustard meal, for the purpose of revulsion. In these latter cases the falsifiers were without doubt ignorant that they were guilty of the *crime of homicide.*

* A vinegar which contains only 1 part of sulphuric acid mixed with 99 parts of vinegar, exhibits these characters in a marked degree.

eighth of its volume, allow it to cool, the residuum is treated with four times its weight of alcohol at 40°; the alcoholic solution is filtered; distilled water is added; the alcohol is evaporated; then the solution of muriate of baryta is added until no more precipitate is thrown down; the precipitate is collected on a filter, washed with boiling water, dried, weighed and the weight of the acid deducted.

A very simple method of detecting the presence of sulphuric acid in vinegar is the following.* Take a certain quantity of the vinegar supposed to be adulterated, place it in a small porcelain capsule, or a platina vessel is better, then heat it to entire evaporation. If the vinegar does not contain sulphuric acid, the vapour which arises during evaporation, does not possess any peculiarity; if, on the contrary, it contains this acid, at the end of the operation, the vapour of sulphuric acid becomes apparent, which is white, dense and suffocating. This extremely simple manner of recognising the falsification of vinegar by sulphuric acid, does not indicate the proportion of the sulphuric acid introduced.

Methods of recognising the falsification of vinegar by muriatic acid.

Many modes have been proposed to detect this adulteration; the best is the following; take 100 grammes of vinegar, place it in a retort and submit it to distillation continued a sufficient length of time and so as to drive over all the acid into the receiver, then pour upon the distilled product a solution of nitrate of silver, which if the vinegar is pure should afford no precipitate, and which furnishes a white curd-like precipitate, insoluble in nitric acid, soluble in ammonia, if the vinegar contains muriatic acid. The precipitate of chloride of silver, is collected on a filter, washed and dried, then from its weight deduct the weight of the muriatic acid upon the basis of the established formulæ which assume that 100 parts of silver

* This method has been tried in the presence of several persons and it has appeared exceedingly simple and very convenient.

unite with 32.5 of chlorine, and that97.26 of chlorine absorb 2.74 of hydrogen gas, to form 100 parts of hydrochloric acid.

Method of recognising the presence of nitric acid in vinegar.

The falsification of vinegar by nitric acid is very rare, it is detected in the following manner; the vinegar is saturated with the carbonate of potassa, which is then evaporated to obtain a salt. When the salt is obtained in the dry state, an examination is made to ascertain whether it contains a nitrate: 1. by throwing a small quantity upon live coals; if nitrate of potassa is present, partial deflagration will ensue; 2. by treating this salt mixed with brass filings with sulphuric acid; if it contains a nitrate, reddish vapours are disengaged with the strong odour of nitrous acid, which is not the case if the salt obtained contains no nitrate.*

Method of testing vinegar mixed with oxalic or tartaric acids.

These sophistications which are scarcely now met with, can nevertheless be determined, 1. by the evaporation of the vinegar, which, when it contains these acids, leaves a crystalline residuum, a residuum which should be afterwards examined; 2. because vinegar thus adulterated, evaporated to two-thirds, and then poured into a solution of potassa, occasions a granular crystalline precipitate of the *oxalate* or the *tartrate of potassa*, which is not obtained when the vinegar does not contain these acids.

Method of recognising the alteration of vinegar by acrid substances.

The addition of acrid substances to vinegar is of ancient

* We have been assured that the vinegar makers have augmented their product by sulphuric acid containing nitric acid; we have never met with vinegar thus falsified, but we know that for some time, the sulphuric acid of commerce has contained a small quantity of nitric acid, arising from a new method of preparing it.

date. Lamarre in his *Traité de la Police*, says that vinegar makers add to their vinegar, red pepper in order to render it more pungent.

Some manufacturers introduce into the confection of vinegar, long pepper, pyrethrum, grains of paradise, mustard seed, and other acrid vegetable substances. The methods of detecting the presence of these substances, is to evaporate at a low heat this vinegar until it attains the consistence of an extract, then to examine the residuum, which has an acrid biting and even caustic taste, when these substances have been added.

Vinegar thus medicated, if tasted carefully can readily be recognised. In effect, it leaves upon the palate and in the throat an acrid, then burning sensation.

Means of detecting the presence of copper and lead in vinegar.

The presence of these mineral products, cannot be considered as a falsification, but as the result of negligence in the fabrication, or rather of the unfitness or of the bad choice of the utensils which have been employed for keeping the vinegar. The presence of these mineral preparations can be readily determined, 1. by sulphuretted hydrogen, which imparts a brown colour to the liquid and indicates the presence of lead and even copper; 2. by ammonia, which occasions a blue colour when the vinegar contains a salt of copper; 3. by the ferrocyanate of potassa, which occasions a grumous precipitate when a salt of copper is present; 4. by the chromate of potassa, which affords a yellow precipitate when a salt of lead may exist in the vinegar. But in order to render the effect of the reaction more sensible, it is better, when these salts are sought for in vinegar, to evaporate it to three-fourths and to experiment only upon the remainder, which will contain them in a less dilute state.

Of the modes of appreciating the strength of vinegars.

Many methods have been proposed to determine the strength of vinegar, that is to say, its degree of acidity.

These are, its saturation by potassa, by carbonate of lime, by ammonia, lastly the acetometer has been employed. This last, employed by dealers, is less efficient, for the density of vinegar may increase in an inverse ratio to its purity; thus an article which contains less acid, but a large quantity of salts and organic matters, exhibits a high degree upon the instrument; vinegar adulterated with sulphuric acid, also in this way indicates a degree of strength which is not due to the vinegar.*

From the experiments which we have made with the vinegar of Orleans,† compared with other specimens, we have demonstrated that vinegars, which, in the proportion of 100 grammes, saturate 80 decigrammes of subcarbonate of soda, do not exhibit upon the acetometer more than 2° 25′ whilst those which saturate but 60 decigrammes of the same salt, indicate upon this instrument the same degree (2° 25′.)

The process which we deem most satisfactory, in order to appreciate the strength of vinegars, consists in saturating them with the pure, well dried, subcarbonate of soda. The following is the manner of operating :—

Take the crystals of subcarbonate of soda, expose them to heat, collect the product of the desiccation, and reduce it to powder, which should be preserved in a glass ground-stoppered bottle. When it is intended to test a vinegar, 10 grammes are taken, and the quantity of subcarbonate of soda, required to saturate it, is noted. We have noticed that 10 grammes of most vinegars of good quality, sold in Paris, demand for their saturation from 7 to 8 decigrammes ; (from 14 to 16 grains) of the subcarbonate of soda.

We may likewise affirm that the employment of the instru-

*We have observed that the addition of sulphuric acid to the vinegar of Orleans, in the proportion of 5 to 100, caused the acetometer to stand at at 5°.75′ while prior to its addition, it only stood at 2°.25′.

† These experiments were made upon vinegars which were obtained from Orleans by a Pharmaceutist of that city, who was desirous of facilitating our labours.

ment called acetometer can lead to error, from its construction, dimensions, and the length of the divisions marked upon it. We have obtained the following results, when operating with two instruments bought in Paris, from two makers, MM. R. and L.

Orleans vinegar, No.	1.	*Acetometer L.*	2.90.	*Acetometer R.*	2.25
" "	2	"	3.	"	2.25
" "	3	"	3.10	"	2.50
" "	4	"	3.10	"	2.50
" "	5	"	3.	"	2.25
" "	6	"	2.80	"	2.25
" "	7	"	2.50	"	2.10

It is plain, from the above results, that not only these instruments, when placed in the same vinegar, do not indicate the same degree, but that, moreover, these degrees are not uniform as respects the differences. It is true, that upon one of the instruments, the divisions were very close together, and that it was very difficult to note the differences in all cases. The best acetometer will be that, which, from its size, presents upon its stem divisions so distant, that they can easily be observed.

We shall not conclude this note, without stating, that, for some time past, made up vinegars have been prepared at Paris: these do not contain the acidulous tartrate of potassa present in wine, but most generally a salt, the base of which is lime. These vinegars, which do not possess the freshness of wine vinegar, and which I have investigated, contain a small quantity of sulphuric acid ; but it exists in so small a proportion, that we are not of opinion that it is added to give strength to the article.

With this terminates what we have to say upon vinegars. We think that by employing the methods of experimenting which we have indicated, a guarantee is afforded against the frauds practised by the dishonest, to pervert a product, which, in the present state of our civil existence, must be considered as of the first necessity.

Acetic acid is also used to increase the strength of vinegar. A manufacturer of acetic acid, a few years ago, recommended the employment of this acid to increase the acidifying material. Vinegar makers, who could not obtain a good article from the wines of a bad year, followed the advice which was given them, and it was so profitable in the manufacture and sale, that, for some time past, its employment has not only been introduced for this purpose, but it is added to vinegar already formed.

Vinegar dealers pursue the same method, especially to give force and strength to the aromatic vinegars which they obtain by macerating fresh plants in vinegar: we may state incidentally, that the maceration of fresh plants is not only injurious because it weakens the strength of vinegar, but because it imparts to this liquid a peculiar disagreeable taste, while on the other hand, if dried plants are employed, the vinegar has more strength, and the aroma which it acquires is pleasanter.

The acetic acid which is employed to regenerate vinegar is obtained by treating the acetate of soda with sulphuric acid, distilling in suitable vessels, and collecting the acetic acid which passes over and becomes condensed. This acid should not contain sulphuric acid or metallic salts.

Additions by M. Julia de Fontenelle.

In the same manner as our honourable colleague, M. Chevallier, we have had the opportunity of convincing ourselves of the falsification of wine vinegar, especially in the interior of France. We have known many vinegar makers in the department of Aude, who place in a large vat the residuum of the distillation of red wine, with a fourth part of wine in weight, and a fourth of good vinegar; the degree of acidulation is finally given by sulphuric acid. The fabrication of this had almost cost the life of one individual. He had as a preliminary step poured into the vat about 100 pounds of the residuum of wine (*repasse*) with the quantity of sulphuric acid

requisite to make 18 casks of vinegar, he then descended into it to mix the liquid with his feet, the severe scalding which was the immediate result placed his life in great jeopardy. At Barcelona during the yellow fever, all the vinegar was consumed, I have been correctly informed that it was manufactured from 10 casks of water, 2 of vinegar and 1 of inferior wine, (to give colour to the vinegar) and a sufficient quantity of sulphuric acid.

To the methods pointed out by M. Chevallier we shall now add those, of which we ourselves have a knowledge. It is well known that vinegar manufacturers, instead of giving strength to weak vinegars by the addition of spirit, or some sugary substance, prefer to add some of the acids called mineral, principally the sulphuric, as much on account of the saving in price, as of the promptness of its operation. This fraud has been detected by Demarchy in some vinegars of Paris and especially in Champagne, at St. Dizier and among the retailers of vinegar.

M. Descroizilles has given a method of detecting sulphuric acid in vinegar, which we think should be noticed. This skilful manufacturer recommends touching a drop of the infusion of litmus, or litmus paper, with the suspected vinegar. If it is pure, the blue colour reappears after drying; if on the contrary it remains changed, it is a proof of the presence of an acid foreign to it. This test with litmus may approximately indicate the quantity of acid added. In effect, says M. Decroizilles, after the falsification of vinegar has been made evident and its acetometric degree has been determined, a new trial of saturation is commenced by pouring at intervals a demilitre of the acetometric liquid into it, and at each time touching a drop of the infusion of litmus with the vinegar in its several states of saturation; when the saturation is complete, and the litmus is no longer reddened, if the experiment indicates 12 degrees, there will be upon the pallet 24 red drops. The pallet is then slowly heated to dry them, and the number which remains of a red colour is counted. If 8 remain and if the

8th is a little reddened, it may be inferred that this vinegar owes one-third of its sourness to a foreign acid. If it has already been determined that it is the sulphuric, the quantity of acetometric liquid employed to saturate them is calculated, and in this way the proportions of sulphuric acid per litre which have been added, are obtained.

These experiments and calculations may appear a little difficult to those unacquainted with chemistry.

Nitric and muriatic acids can be detected in vinegar by saturating it with subcarbonate of soda, filtering and crystallizing. If the acid is muriatic, there will be found with the acetate of soda, a salt possessing a very saline taste, and in cubic crystals, while the other salt crystallizes in prisms. The proportion of muriatic acid can be determined by dissolving these salts and adding nitrate of silver. From the precipitate obtained, the weight of the muriatic acid may be calculated, from a knowledge of the constituent proportions of nitrate of silver.

If the sophistication is made by nitric acid, which is exceedingly rare, in consequence of the high price of this acid, a nitrate of soda is obtained, crystallizing in rhomboidal prisms, along with an acetate. The first salt has a cooling taste; it fuses upon coals like salt petre. The quantity of nitric acid can be determined by drying these two salts, and treating them with concentrated alcohol, which dissolves the acetate without touching the nitrate. From its weight the quantity of nitric acid is determined by its constituent principles.

It may happen that in commerce, muriatic or acetic acids may be mixed with sulphuric acid: to detect this last, a piece of linen or of paper should be dipped in the acid to be tested, it is then to be dried by the fire; if it is carbonized, it is an indication of the presence of sulphuric acid. It is evident, as a consequence, that there will be a want of precaution and of prudence, if free washing is dispensed with, after the employment of acids, both in bleaching and in brightening blue colours.

In general, in all the operations where the acids remain adherent to the stuff it is necessary to remove them, either by free washing, or alkaline solutions.

Journal de Chemie Medicale.

ART. VII.—ANALYSIS OF TARTAR EMETIC.

By Mr. Richardson.

Mr. Phillips' analysis of this salt, differing from Dr. Thompson's in the proportion of water which it contains, Mr. Richardson repeated the experiments of the latter, employing the same specimen. The analysis was conducted in the following manner: 25 grains were heated for a considerable time on the sand bath, at a temperature of about 400° F., and lost 1.21 grains or 4.84 per cent. The residuum was dissolved in water, and the antimony precipitated by sulphuretted hydrogen. The precipitate, after being washed and dried, weighed 13.3 grains. But 11 sesquesulphuret of antimony : 8 antimony : : 13.3 : 9.67 grains = 11.48 grains oxide of antimony. The liquid and washings from the above precipitate were carefully evaporated to dryness and the residual salt weighed 13.23 grains. From the composition of bitartrate of potassa, it follows that the result is,

Oxide of antimony,	45.92 atoms.
Potassa,	12.80
Tartaric acid,	35.25
Water,	4.84

These being resolved into atoms, give the following constitution:

Oxide of antimony,	4.83	2.26 atoms.
Potassa,	2.13	1.00
Tartaric acid,	4.27	2.00
Water,	4.30	2.01

The result of Dr. Thompson's analysis was

1.997	at.	tartaric acid,
1.92		protoxide of antimony,
1.		potassa,
2.139		water,

The mean of the two analyses:

Oxide of antimony,	2.12
Potassa,	1.00
Tartaric acid,	1.96
Water,	2.07.

Leaving no doubt of the true composition of the salt, being

2	at.	oxide of antimony,	19.00
1		potassa,	6.00
2		tartaric acid,	16.50
2		water,	2.25
			43.75.

Edin. Med. and Surg. Journal.

ART. IX.—EXTRACT FROM A REPORT MADE TO THE ROYAL ACADEMY OF MEDICINE, JULY 1836, UPON A METHOD OF PURIFYING COMMON MANNA, AND CONVERTING IT INTO FLAKE MANNA. By M. Dausse.

The Academy, at its sitting, in April last, received a letter from M. Dausse sen., a Pharmaceutist of Paris, in which he announces a new mode of purifying manna in sorts by means of animal charcoal. This letter was accompanied by a specimen of flake manna obtained by the method indicated, for which the author solicits the approval of the academy.

The committee have thought the subject should be considered under three points of view.

1. Whether the method proposed by M. Dausse is new?

2. Whether there is a similarity of composition between the manna which he has purified and natural flake manna?

3. Whether there exists between the two articles identity of therapeutic properties?

The reply to the first question is furnished by Baumé in his Eléments de Pharmacie. Some persons, says this celebrated pharmaceutist, manufacture flake manna. To do this they dissolve common manna in a small quantity of water, allow the liquid to settle, decant it in order to separate the impurities, then inspissate it to that degree that it will become congealed upon cooling, they then suspend threads in it and immerse them several times in succession, after the method of the candle makers. This manna is a pretty good imitation of the flake manna, and it may be said that it equals it in quality, as it is nothing else than a very pure manna. Let us remark, in the first place, that at the time Baumé wrote this, vegetable analysis was yet in its infancy, that the employment of animal charcoal, as an agent for the removal either of colour or smell, was not known, and that notwithstanding there was obtained by the simple method of purifying manna which has been described, an article which had all the appearances of flake manna. Allow us to state in addition, that it was known to one member of the committee and to many traders, that a pharmaceutist of the school of Paris, M. Avequin, actually prepared, eight years ago at Port au Prince, in his house at Chaillot, a very beautiful manna in flakes, by treating, in the same way as M. Dausse, common manna with animal charcoal. We are not informed of the causes of failure to this speculation, but at the same time it is certain that the use of animal charcoal in the purification of manna was known in the year 1828.

Let us pass to the second question! is there parity of composition, or more rigidly, is the proportional relation between the components, the same in the manna purified by M. Dausse and natural flake manna? To answer this question, the Committee made some experiments, the principal re-

sults of which will be cited; but, in the first place it may be stated, that the manna of M. Dausse presents itself in stalactiform concretions, much resembling natural flake manna; that it is deprived if not of the whole, of at least a part of the nauseous odour peculiar to this substance. Some pieces have the whiteness of recent manna, while others more coloured resemble more the manna of two years standing. To equal whiteness of both kinds, the purified manna is less friable, it becomes more glutinous by trituration, it is also more hygrometric. Thus, as states the author in his letter to the Academy, flake manna prepared artificially, is completely dissolved in water without disturbing its transparency; let us observe at the same time that this solution is a little more coloured than that of natural flake manna, that it does not redden in the same way litmus paper, a result evidently due to the reaction of the free acid of the manna and the small quantity of carbonate of lime contained in the animal charcoal used in the purification. The purified manna, more soluble in boiling alcohol than natural manna, leaves nevertheless a small brownish coloured residuum, and what is remarkable, contains much less mannite. Thus we have obtained from the manna of M. Dausse but 44 per cent. of this principle, while the flake manna of commerce furnishes 68 per cent. As is manifest, the purified common manna, while it assumes the appearance of flake manna, contains one-third less of one of its principal elements, and as a necessary consequence, the gum and sugar do not exist in the same proportions. Therapeutic experiments alone can decide the question, to what degree do the two articles, differing in the proportion of their component parts, resemble or differ from each other in their medical properties. The member of the committee who especially undertook this part of the examination, has administered the purified manna to many patients under his care in the wards of the Hotel Dieu, and the following are his results:

Nine subjects of different ages, constitutions and pathological conditions, took two and a half ounces of manna each.

1	had	12 stools,
1	"	10,
2	" from	5 to 6,
1	"	3 to 4,
1	"	1,
1	not observed,	
1	none,	
1	was vomited.	

The result was analogous to that obtained generally by the employment of any species of manna, which some persons digest entirely, and which others vomit after having taken. This proves, to remark in passing, how difficult it is in therapeutics to determine rigidly the action of certain medicines. For if manna purified as has been specified in this report, differs from flake manna by a small proportion of mannite, the principle to which many physicians refer its purgative property; if, on the other hand, the animal charcoal removes in a great measure the nauseous principle of the manna, in which, other authors state, resides exclusively the purgative action of the medicine, it should logically be concluded that purified manna is less purgative than flake manna and yet experience does not justify this deduction.

Conclusion.

The Committee is therefore of opinion: 1. That the manna presented to the Academy by M. Dausse, may be employed without inconvenience under the same circumstances as flake manna.

2. That the method announced by M. Dausse not being original, it is not proper to award to this pharmaceutist the approbation which he solicits, inasmuch as it would recognise a discovery where there exists but the simple revival of a method.

3. That acknowledgments should be tendered to M. Dausse for his communication.

Signed *Honoré*, *Caventou* and *Planche*.

Journal de Pharmacie.

ART. X—NEW METHOD OF PREPARING IODIC ACID.

By Lewis Thompson, Esq.

Put one atom or 126 grains of iodine, into a proper bottle, with 24 ounces of water, and pass chlorine previously washed in cold water through the mixture, until it shall have become colourless; set the solution aside for an hour, then heat it to 212° Fah. to disengage the uncombined chlorine, and add 2½ atoms or 295 grains of recently precipitated oxide of silver, boil the whole for ten minutes, filter and evaporate carefully to dryness. The product is pure anhydrous iodic acid.

Mr. Thompson concludes, from the above process, that there is no such acid as the chloriodic, the acid so called being in fact merely a chloride of iodine, which when dissolved is converted into muriatic and iodic acid and a variable quantity of iodine. He has never been able to unite chlorine and iodine in the proportions necessary to form these acids without the intervention of water, and an excess of iodine, but he believes it may be effected in a sufficiently reduced temperature. In one experiment, 50 grains of iodine were combined with 41.5 cubic inches or about 30 grains of chlorine; the substance thus formed, when put into a large quantity of water and exposed for some days to the sunshine, deposited 8 grains of iodine, and became of a pale yellow colour. Mr. Thompson is convinced that the muriatic and iodic acids exist ready formed in the solution, not only from the taste and smell, but because he obtained free muriatic acid from it by distillation, although, when this was continued until the solution became a good deal concentrated, these acids reacted on one another producing chlorine and iodine.

The iodate of ammonia, he states to be a highly crystalline granular powder, possessing but little solubility; it is prepared by saturating the solution of the muriatic and iodic acids with ammonia, when it falls down leaving the muriate in solution. He finds that the iodic acid is decomposed by sulpho-cyanic

acid, and the sulpho-cyanates of potassa and soda, and also that saliva, in consequence probably of the sulpho-cyanate of potassa which it contains, decomposes iodic acid and produces with it and starch a blue precipitate, not distinguishable from that produced under similar circumstances by morphia.

The importance of this discovery, in a medico-legal point of view, is considerable, since iodic acid is now relied on by many as a test for morphia.

Mr. Thompson thinks the above method for preparing iodic acid is cheaper and safer than that of Sir Humphrey Davy, and that it affords a purer acid than that of Gay Lussac. He agrees with Davy in thinking, that Gay Lussac's acid is sulpho-iodic and not iodic acid.—*Ed. Med. and Surg. Journ. From Lond. and Ed. Phil. Mag.*

ART. XI.—EXTRACT OF A LETTER FROM PROFESSOR CHRISTISON OF EDINBURGH TO M. ROBIQUET, ON GAMBOGE AND SCAMMONY.

I propose to send you a long memoir, upon the origin and composition of gummi gutta. I am aided by a most intelligent collaborator, or rather a collaboratress, who is the wife of a Colonel of Ceylon. My colleague, Dr. Graham, and myself have demonstrated that the gummi gutta of Ceylon (which never comes to Europe except to the curious as myself) is identical as regards its composition with the gummi gutta from Siam, which is found in commerce, and that the plant of Ceylon, which Murray of Gottingen declares, from the manuscripts and dried plants of Kœnig, should produce the true gamboge, and which he designates under the name of *Stalagmites gambogioides*, is not a correct deduction, although it be adopted by the Pharmacopœias and Pharmacologists, and that the gamboge of Ceylon is the product of the Garcinia morella of Decandolle, or the Mangostana mo-

rella of Goertner and Lamark, but that this plant presents such characters that botanists will be obliged to establish for it another genus in the natural order Guttiferæ. It is very curious, that the examination of the original specimens of Kœnig whence Murray drew his description, has led to the singular discovery that these specimens are falsified; many important organs being attached to the branches with the gum, in what ever way this has happened, it is what I can affirm.

I have also another memoir almost finished upon the varieties and falsifications of scammony with details upon its composition. I believe that I told you in my last letter that I was occupied with it. Since then I have been enabled to examine more or less than thirty different varieties and I have analyzed eighteen. I believe that the details given by Pharmacologists, of the external characters and the chemical composition of scammony are not applicable to the scammony which is found at present in commerce, probably because the fabricators have changed their mode of preparation in proportion as the sale has increased. One thing certain is that pure scammony is so rare, that even in London, where according to my knowledge the greater part arrives, it was not possible to find a pure specimen during a whole year.

Journ. de Pharm.

ART. XII.—ON THE EFFECTS OF TERRESTRIAL RADIATION ON THE PROCESSES OF VEGETATION; AND SOME ACCOUNT OF THE CHINESE METHOD OF PROPAGATING FRUIT TREES. By J. Murray.

It has been shown that the cooling process of radiation, by which the temperature of the surface of the earth is lowered so considerably, differs materially on the inclination of the hill compared with the bosom of the valley. Mr. Daniell, indeed, states, on one occasion, a difference amounting to 30°: that is to say, the thermometer on the inclined surface maintained a higher temperature by 30° than another placed on the horizontal or level plane of the adjoining valley. This difference is certainly enormous; but it is proved beyond a doubt, that a slope, an inclined plane, for instance, radiates less by many degrees than the surface which is altogether horizontal. Indeed, I think we may collect abundant proof of this important fact among the mountains and the valleys of Italy. On the plains of Piedmont, the vines which are suffered to attain a considerable altitude on lofty poles planted as their support, are detached from these poles towards the approach of winter and prostrated on the earth, where they are secured from injury by the straw.—This treatment protects them from the effects of the intense, though short winter which reigns on the plains of Piedmont; for even at Turin, the water in my room has been congealed into a solid mass of ice throughout its entire extent. The olive succeeds in Tuscany, but the almond, pomegranate, and plants of the Citrus family, flourish but imperfectly; and yet on the acclivities of the amphitheatre of the Appennines, which forms a semicircle round the magnificent city of Genoa, you find that the pomegranate, the lemon, and the orange, mature their fruit and luxuriate. Even the imperial city is indebted for the palm branches to the palms which succeed in the open air at Nice. Now, the only difference in these circumstances consists in a reduction of the loss

sustained by radiation, and the attempered influence of the sea breeze, which more than counterbalance the increase of warmth imparted by the sunbeams to a more southern clime: perhaps even the excellence of Monte Somma wine may have something to do with the acclivity on which the vineyards are planted. To my vision, fruit trees planted on terraces, and rising one above the other in amphitheatrical form appear beautiful; but this has become, I suppose, unfashionable, because it happens to be a gem from the antique. Now, restlessness in search of something new, however absurd, is incessant. The ancients appear, in this respect, to have known what they were about; and I must frankly confess that, in my estimation, they acted wisely, and had the better of us, and that we are decidedly in the rear. To this cause I attribute the remarkable fertility of the land of Judea in former times. Its susceptibility is sufficiently apparent, and there still remain existing vestiges of this mode of cultivating the flanks of the valleys, or the sides of the diversified hills of Palestine, to a considerable altitude. It is still, however, very questionable, whether low walls, constructed of brick, or of stone and mortar, quite vertical, would succeed so well as the surface of a calcarious or sandy soil, at an angle, for example, of 45°. A sandy soil absorbs heat, and continues heated, because sand is an indifferent radiator, and is, moreover, a non-conductor of caloric (heat;) so that vines, &c. in contact with such a surface, would be more than compensated for the temperature they would lose through the medium of radiation; which would also be attenuated from the inclination of the plane.

At St Mary's Isle, the seat of Earl Selkirk, near Kirkcudbright, I remember to have seen a beautiful illustration of my views, in the case of pear trees pinioned to trelliswork in such an inclined surface as I have described; and I have always understood that the crops of fruit which these trees carried were remarkable both for quantity and quality; indeed it must be apparent that under such conditions, spring frosts can have little or no influence, because these frosts are entirely connected

with the principles of radiation, and have little or nothing to do with the temperature of the atmospheric medium. If the soil is not of a sandy consistence, in that case I would employ a thin stratum of sand. I have in my little garden just such a surface, inclined and sandy, and have planted vines with an intention to train them on the surface, on a frame-work, something like cucumbers or melons in a hot-bed. The vine I am making my experiments with, is called Miller's black grape. I have already had ample proof that the healthy luxuriance of other tender plants does not suffer, and that frost has little or no effect on such an exposure.

For the purpose of maturing the fruit, I shall throw a veil of black gauze over the vines; and this will secure me the effects of a powerful absorption of the caloric rays of the sun's beams. Though the radiation from a black surface is proportioned to its absorbent capacity, it will operate during the lengthened day (and at this period of the year the night is reduced to its minimum) in the maturation of the fruit, while the sandy surface is retentive, from its non-conducting character. If bunches of grapes on vines exposed *sub dio*, or reared in the open air, be tied up in white bags, they will scarcely ripen, are small, and want flavour; but if other bunches on the same tree be confined in bags of black crape, the contrast is very striking, in the latter being fully ripe, large, and of a flavour equal to those cultivated on a foreign soil. This fact explains the principle on which I would veil my vines with sable weeds; further explanation would, therefore, be superfluous and unnecessary.

Respecting the Chinese method of propagating fruit trees, it is merely requisite to detach a strip, or narrow ribband, of bark from the branch or limb which is to be separated. The Chinese apply to this a ball of earth mingled with clay, to impart greater consistency to it, and this is covered with moss, and secured by bandages formed of some pliant material; a small pan containing water is suspended over it, and serves to keep the ball moist. This method, as successfully pursued in

this country was first pointed out to me by Sir Lauchlan MacLean, of Sudbury. The Italians often adopt the plan; and I have seen a large orange tree, 14 feet high, loaded with growing fruit, thus separated from the aged parent stock, and exposed for sale in the market at Naples. I have witnessed the plan in full operation near the royal observatory in that city. One obvious advantage is, that no time is lost in the growth of the tree; nay, the very abstraction of the ring of bark from the branch rather expedites than otherwise the evolution of fruit.—The Italians have improved on the rude plan of the Chinese, by enclosing in a tin case the stem of the future independent tree: it is filled with earth, pressed down and covered with moss, which is preserved moist in the way I have already described. This part of it I have improved, by suspending the tin vessel which contains the water on an adjoining branch above the ball, while a woollen thread previously moist, forms a line of communication, and affords a constant regular supply on the principle of the syphon, and the capillary attraction of the fibres of the thread. A lid prevents the loss by evaporation from the surface of the water confined in the vessel.

A linear incision in the bark above a bud, it has been stated, will convert that bud into a branch. Last season I tried several experiments of this kind on a fig, cutting out a narrow strip of bark, over the bud, in the form of an inverted V, and succeeded in producing branches in five out of seven instances. The want of success in these two, I suspect, arose from the imperfect separation of the lips of the bark, and the insufficient depth of the incision.

J. Murray.

ART. XIII.—REVIEW OF THE "REPORT FROM THE SELECT COMMITTEE ON MEDICAL EDUCATION, WITH THE MINUTES OF EVIDENCE AND APPENDIX. Part III. Society of Apothecaries, London. Ordered, by the House of Commons to be Printed 13th August 1834."

We have just received the third part of the Report of the Committee of the House of Commons on Medical Education, in reference to the Society of Apothecaries, and hasten to lay an abstract of it before our readers. It consists of two parts, the one containing parole, the other documentary evidence. The former with the exception of the information communicated by Dr. Christison, is characterized by a degree of arrogance, ignorance of subjects on which the most dogmatical assertions are made, inconsistency, prejudice, and inconclusive reasoning, which *a priori*, we should have considered it utterly impossible for any body of tolerably educated professional men in the present day to have exhibited. But this is not all. The evidence, such as it is, discloses facts which imperatively call upon the Legislature to deprive this incorporate body of those exclusive privileges which they have so long enjoyed. These we are aware are grave charges, which it is incumbent upon us to establish by the clearest evidence. But before we conclude this article, we shall convince every impartial reader, in the most unexceptional manner, by the testimony of some of the leading members of

* We have thought the Review, which we now republish from the Edinburgh Medical and Surgical Journal, would be interesting to American readers, as the information it contains is not generally possessed in this country. As regards the direct purpose of the review and its tenor we are not concerned, as the abuses of which it complains are local, and do not affect us. Still, with respect to the practice of the profession in a country so closely connected with us as England, it is important to possess all possible knowledge, and the present article affords the opportunity of becoming acquainted with facts but lately laid before the public.—Ed.

the Worshipful company, not only that these gentlemen are incompetent to direct the medical education of intended practitioners, but that the incorporation has failed to perform its duties, while in others it has made use of its privileges in a manner not only obnoxious but unjust, and utterly in contravention of the spirit of the Act of Parliament, which conferred them.

Before proceeding to this task, it may not be amiss to lay before our readers, some historical information respecting the Apothecaries' Company:

By letters-patent under the great seal of England, dated 9th April, in the fourth year of his reign, James I. ordained, and granted, "that all and singular freemen of the Mystery of Grocers and Apothecaries of the city of London, and their successors for ever thereafter, for the better ordering, governing, and rule of Men of the Mystery of Grocers and Apothecaries of the city of London, and for the profit, commodity, and rule of the good and honest, and for the fear and correction of evil, and deceitful, and wicked, should be and remain one body corporate and politic in substance, deed, and name, by the name of the Wardens and Fellowship of the Mystery and Grocers of the city of London." In the 15th year, however, of the same reign, a separation between the two trades was effected, by his majesty granting a new charter. By this, 122 individuals therein named, and all other persons "brought up, and skilful in the art, faculty, or mystery of an Apothecary, and the same art, faculty, or mystery, at this time existing, and being Freemen of the Mystery of Grocers of the city of London; and with the same jointly and promiscuously, into one body corporate and commonalty, made and constituted, or being freemen of any other arts, faculties, or mysteries, in the city of London, and with the same into one body corporate, society, or commonalty, heretofore made incorporated or constituted," and all their apprentices legally bound, were separated from the Grocers, and formed into a new incorporation, by the name of "*The Master, Wardens,*

and Society of the Art and Mystery of Apothecaries in the City of London." The reasons assigned in this charter, are thus expressed: "For as much as it is signified unto us, on behalf of our well beloved subjects, the Apothecaries of our city of London, and also affirmed and approved unto us, by our well beloved Theodore de Mayerne, and Henry Atkins, Doctors of Physic, our discreet and faithful physicians, that in these latter years, very many empiricks, and unskilful and ignorant men, and unexperienced, do inhabit and abide in our city of London, and the suburbs of the same, which are not well instructed in the art and mystery of Apothecaries, but are therein unskilful and rude, do make and compound many unwholesome, hurtful, deceitful, corrupt, and dangerous medicines, and the same do sell in many parts of this our kingdom of England, and the same do daily transmit, to the abuse and scandal, not only of them which embrace the knowledge of physic, and of the learned physicians of this our realm of England, professing the same, and of our Apothecaries of our city of London, being educated and expert in the same art and mystery, but also to the great peril and daily hazard of the lives of our subjects." From this extract the reader will see that the putting down of quackery, the procuring of pure drugs, and the faithful compounding of physicians' prescriptions, were the objects sought to be attained by the charter now alluded to. By it the society were empowered to purchase and sell lands, to sue and be sued, to have a common seal and hall, to elect a master, wardens and assistants, clerk and beadle, and to sell drugs. The privileges of the college of physicians, and those of the city of London, were expressly reserved, and it was declared "that expert and approved chirurgeons may exercise their art and faculty; and use and enjoy all and singular their proper practice, as much as belongeth and appertaineth to the composition and application of outward salves or medicines only; so that they do not expose, vend, or expose to sale to others, such salves, or medicines, according to the common manner of the Apo-

thecaries of our city of London." The masters, wardens, and assistants for the time being, were invested with the power of making laws and by-laws for the regulation of the corporation and its concerns. In making laws, however, respecting medicines, they were bound to take the advice of the president and censors of the College of Physicians. Freemen of the Grocers' Company, or of any other arts, were prohibited from keeping Apothecaries' shops, as well as all persons who had not served a seven years' apprenticeship to some freeman apothecary, and been examined, and found competent by the master, wardens, and president of the College of Physicians, or such physicians as he shall appoint for the performance of the duty." Extensive powers were also granted them to "enter into any shop or shops, house or houses, cellar or cellars, of any persons whatsoever, using or exercising the art or mystery of Apothecaries, or any part thereof, within the city of London, or within seven miles of the same city, as well within the liberty as without, where any medicines, simple or compound, wares, drugs, receipts, distilled waters, chemical oils, syrups, conserves, electuaries, pills, powders, troches, oils, ointments, emplasters, or any other thing whatsoever, which belong or appertain to the art or mystery of Apothecaries, shall be probable and likely to be found, and to search, survey and prove if the same be, * * and shall be, wholesome, medicinable, meet and fit for the cure, health, and ease of our subjects; and, also * * to try all and singular persons professing, using, or exercising, or which hereafter shall profess, use, or exercise, the art or mystery of Apothecaries, or any part thereof, within the aforesaid city of London, the liberties or suburbs thereof, or within seven miles of the same city, as well within liberties, as without, touching or concerning their, and every of their knowledge, skill or understanding, in the aforesaid art and mystery of Apothecaries, and to remove and prohibit all those from the exercise, use, or practice, of the aforesaid art or mystery, whom hereafter they shall find unskilful, ignorant, or insufficient, or obstinate, or repugnant to

be examined, by virtue of these presents in the art and mystery aforesaid." They were also authorized to "burn before the offender's door, all medicines or drugs which they should find unlawful, deceitful, inveterate, out of use, unwholesome, corrupt, unmedicinable, pernicious, or hurtful, and to lay, impose and execute punishments, and other pains and penalties, by fines and amerciaments upon such offenders according to their sound discretions, and the ordinances by them and their successors, so as aforesaid, to be made and appointed."

It is evident from the abstract which we have given, that as we have already stated, the sole object in granting the charter, was to secure a supply of pure medicinal substances, and the due and faithful compounding of them according to the formularies or prescriptions of physicians, and that the apothecary derived no title whatever from it to practise either medicine, surgery, or midwifery. The apothecary was a mere appendage to, or servant of the physician, and many of them, in olden times, had actually acted in this capacity, and derived all their knowledge from the casual instructions of their masters. But, besides compounding medicines, the apothecary—in many cases—was called upon to administer them, or see them administered, and in this manner picked up a smattering of knowledge, which made him useful in trifling cases, or when a physician could not be procured, much in the same manner as a client will, in the absence of his legal adviser, frequently consult his clerk. This usurpation met with some opposition on the part of the physicians, but being sanctioned by the community, was persisted in by the apothecaries, whose increased importance was evinced by the acts of Parliament, passed to exempt them from serving offices.

In what manner the society fulfilled its duties within the bounds of its jurisdiction, we have no means of knowing accurately.—But it may be safely inferred from the number of complaints which were made, that they were inefficiently performed. It will be observed, that the charter gave the society no power beyond London and seven miles round,

and thus, though throughout the country the lieges were left to the mercy of any unprincipled and ignorant man who chose to designate himself by the title of Apothecary, or Surgeon, or Surgeon Apothecary, as suited his fancy, the society had no means of putting an end to this evil; and an association was formed for the purpose both of protecting the public, and elevating the statutes of the society. The following extracts from the evidence of Dr. Burrows, exhibit the true state of the great body of the profession at that period, and the objects of the association.

"239. What was the state of the medical profession, as regarded general practitioners, before the act of 1815? There was a great number of individuals practising as general practitioners, who had certainly not received a competent education, and therefore were not acting in a manner creditable to themselves, or beneficial to the public."

"240. You acted as chairman to the General Association of Apothecaries, and Surgeon Apothecaries of England and Wales? I did."

"241. Did you principally conduct the correspondence of that Association, with the practitioners of England and Wales? Wholly; there was a secretary, but I conducted the whole of it."

"242. Was the act of 1815 occasioned by the proceedings of that association? Unquestionably."

"243. What were the evils to remedy which the Association was formed? I have extracted the principal grounds: First, that persons were allowed to practise as surgeons, as apothecaries, and as midwives, to dispense medicines and to compound prescriptions in England and Wales, who had never received any education to fit them to exercise those functions, whereby the public were much injured, and the character of the medical profession was lowered."

"244. Their principal object was to reduce the number of those who were practising without having received any medical education at all? Surely, not only to reduce their number, but to prevent them from practising altogether.

The second complaint was, that there was no superintending power to examine into the qualifications of the persons entering upon those several branches of the profession; that in consequence of this lowering of the character of the general practitioner, it was exceedingly difficult to procure apprentices; that as the general practitioner had no legal right to charge for his attendance on the sick, he was compelled to resort to an expedient for remunerating himself, exceedingly revolting to the feelings of a liberal mind; that a most cruel system of farming the medical attendance upon the parochial poor to the lowest bidder, without any regard to the proper qualifications of the party tendering, had become general. These were the five particular points that the practitioners pressed upon the attention of the association."

The Association began to meet in 1812, and in December of that year, petitioned parliament. In March, 1813, a bill was introduced into the House of Commons, but, after being read a first time, it was withdrawn, in consequence of the opposition offered to it, principally, as would appear, by the Colleges of Physicians and Surgeons. The Society of Apothecaries professed to act according to the instructions which might be given to them by the College of Physicians, but remained to a certain degree neutral. In the following year, the bill was again brought in, and several clauses introduced into it, of which the members of the association did not approve, but to which, finding that they could do no better, they were obliged to consent. The opposition of the colleges seemed to be withdrawn at the intercession of Mr. George Rose, as it was through him that it was communicated to the association, that they had agreed to the framing and introduction of a bill, and he became the organ of communication between the parties. Nine-tenths of the members of the association were surgeons, and some of them belonged to the Society of Apothecaries. In 1815, a bill was passed, which has given rise to so many just complaints, both as to its provisions, and as to the manner in which it has been carried into effect, and which it seems to have been the determination

of the witnesses whose evidence we shall presently examine, to exhibit as being perfect in both.

This act (55 Geo. III. cap. cxciv.) confirmed the whole of the charter of James, except in so far as it repealed that portion which directs the master, wardens, &c. to examine the shops of apothecaries, examine medicine, and impose penalties, and substituted for it a power to enter the shops of every apothecary in England and Wales, at any time during the day, to test the various drugs or medicinal substances found therein, to destroy such as they should find to be "false, unlawful, deceitful, stale, unwholesome, corrupt, pernicious, or hurtful," and to impose penalties upon offenders; "for the first offence, the sum of five pounds; for the second offence, the sum of twenty pounds; and for the third, and every other offence, the sum of twenty pounds." Additional powers were also granted and duties imposed. Section fifth, which some of the members of the Apothecaries' Company make a boast of violating, enacts "That if any person using or exercising the art and mystery of an apothecary, shall at any time knowingly, wilfully, and contumaciously, refuse to make, mix, compound, prepare, give, supply, or administer, or any way to sell, set on sale, put forth, or put to sale, to any person, or persons whatever, any medicines, compound medicines, or medicinable compositions, as directed by any prescription, order, or receipt, signed with the initials in his own hand writing" of any physician licensed to practise physic by the Royal College of Physicians of London, or either of the Universities of Oxford, or Cambridge, the offender, on complaint being made by the physician within twenty-one days, shall, unless he can show a justifiable reason, on conviction before any justice of peace, "forfeit his certificate, and be rendered incapable in future of using or exercising the art and mystery of an apothecary, and be liable to the penalty inflicted by this act, upon all who practise as such without a certificate, in the same manner as if such party so convicted, had never been furnished with a certificate, enabling him to practise as an apothecary; and such offender, so deprived of his certificate, shall

be rendered and deemed incapable in future of receiving and holding any fresh certificate, unless the said party, so applying for a renewal of his certificate, shall faithfully promise and undertake and give good and sufficient security that he will not in future be guilty of the like offence."

Sections XIV. and XV. enacted, "that from and after the first day of August, 1815, it shall not be lawful for any person or persons (except persons already in practice as such,) to practise as an apothecary in any part of England or Wales, unless he or they shall have been examined by the court of Examiners, or the major part of them, and have received a certificate of his or their being duly qualified to practise as such, from the said Court of Examiners, or the major part of them as aforesaid, who are hereby authorized and required, to examine all persons in the science and practice of medicine, and his or their fitness and qualification to practise as an apothecary, *** provided always, that no person shall be admitted to such examination, until he shall have attained the full age of twenty-two years. Provided always, *** That no person shall be admitted to any such examination for a certificate to practise as an apothecary, unless he shall have served an apprenticeship of not less than five years to an apothecary, and unless he shall produce testimonials to the satisfaction of the said Court of Examiners, of a sufficient medical education, and of a good moral conduct."

The act also provides for the appointment of a Court of Examiners, to act under an oath, specifies the qualifications necessary to render a man eligible to be appointed an examiner of drugs or candidates, and the manner in which all regulations shall be made, enacts penalties, points the application of these, and fees received on examination, and limits actions o six calendar months after the offence, &c. Chemists and druggists are excepted from the operation of the act, and the rights and privileges of the Universities of Oxford and Cambridge, the Royal College of Physicians, and Royal College of Surgeons are preserved to them.

This obnoxious act differs from the charter in nothing save

the granting of additional powers to a body which had failed in performing its duties, and which so far from being prepared to give effect to its provisions seemed to be overwhelmed with the trusts and privileges committed to it. Clear proof of this is found in the testimony of Dr. Burrows, who was the principal agent of the association to which the Society of Apothecaries is indebted for the act. He was asked, if between the passing of the act and his retirement from the Board of Examiners, the Society of Apothecaries were disposed to act in carrying the statute into effect, in a manner conducive to the public interest? and his reply is "undoubtedly so; generally speaking, most decidedly. It required some little trouble to convince them of the course they ought to pursue. In fact, it seemed to come upon them by surprise. For although they had solicited the bill, yet they had not prepared their minds for the extensive privileges which that act gave them, nor for the great benefit which might accrue to the public by carrying the act into effect." He then states that the greater part did not know the important duties and powers that had devolved upon them. In a subsequent examination, he affirms that "the members of the Court of Examiners differed extremely in their interpretation of the act and that he thought that many of them had not sufficiently prepared themselves to administer a statute which was so important and gave such extensive privileges. They had obtained the act, but did not understand the spirit of it." He, however, asserts that "they have carried the act into effect in the most material matters, in a manner which has been most highly conducive to the benefit of the members of the profession, and to the benefit of the public." How far this statement is well founded, we shall have an opportunity of showing in the course of this article. In the mean time we proceed with our introductory remarks.

We have already stated, that an apothecary at first was nothing more than the name really implies, an individual who kept a supply of medicines and compounded them as directed. The above mentioned act in reality made him superior to a

physician, inasmuch as it not only conferred the privilege of practising, but also of compounding and dispensing medicine, which no graduate of a University, save Oxford and Cambridge is permitted to do, unless a fellow or licentiate of the Royal College of Physicians of London, in which case the provision is nugatory, as this body prevents its members from acting as general practitioners and dispensing medicines. Mr. Nussey, indeed, states in his evidence that it was decided in the reign of Queen Anne, in the case of the College of Physicians, against an individual of the name of Rose, that an apothecary was competent to ascertain the nature of a disease and to treat it, and that he can refer to some proof of that; into which, however, he does not enter. In answer to the question, whether this decision goes so far as to define what an apothecary is now? he says "at the present moment, there are very few individuals practising pharmacy exclusively, perhaps not more than half a dozen, in the whole town. But the apothecary strictly is still an individual who simply attends the sick and treats disease." The examination then proceeds. "Is he a person who attends an individual affected with some internal disease, not requiring external or manual aid, who prescribes for the cure of such complaint and supplies the medicine? He is. The supplying of medicine is an essential part of it? That is as it may happen. In my situation in life, I am sometimes called upon to prescribe; to give my opinions without sending medicine. You are not the only instance of that? I speak of myself, there are others. What is the definition of an apothecary as distinguished from other practitioners? That which the chairman has already stated, is the meaning I apprehend of the word apothecary."

So then, the apothecary, according to Mr. Nussey, the chairman of the Apothecaries' Company, acts in many respects as a physician. *He treats any internal disease not requiring external or manual aid.* Now this will evidently prevent him from treating the greater number of inflammatory complaints, in fact all complaints which require blood-letting in any form. Definitions, as Dr. Johnson long ago remarked, are hazard-

ous; and, in the present case, Mr. Nussey, in endeavouring to aggrandize the apothecary, has precluded him from treating many of those diseases in which the aid of the general practitioner is most frequently required. The apothecaries, however, do not confine themselves within the narrow limits, prescribed for them by their chairman. They engage in the practice of midwifery, and that nothwithstanding it is declared by one of the Court of Examiners, that the delivery of a woman is considered a surgical operation, and according to the opinion of counsel, they have no power to examine a candidate for their license, on his obstetrical knowledge.

By another member of the Court, Mr. J. Bacot, it is admitted that although it is necessary that every general practitioner should be well instructed in surgery, many apothecaries are quite ignorant in this respect. Thus a licentiate of the Apothecaries' Company may practise Midwifery and Surgery, without having his qualification to do so tested by any board. It is true, the witnesses seem to regret this state of matters, but it does not appear that any very active steps have been taken to obviate the evil. It may be urged by way of palliation, that most of these licentiates pass the College of Surgeons, but there is no power to force them to do so, and this at all events would be no guarantee that they are possessed of any knowledge or skill in Midwifery. They seem to have been quite content to leave matters as they were; satisfied that their licentiates possessed a monopoly of general practice. From their not asking power to examine the candidates for their license on Surgery and Midwifery, it would appear that they conceived less mischief to be likely to result from an ignorant individual treating a case of strangulated hernia, or retention of urine, or managing a delicate woman in the most critical situation of her life, than in failing to give an ointment its proper consistence, or a draught an agreeable colour and flavour. With them, a knowledge of pharmacy and the external characters of drugs would appear to be the most important to be required; but the reader will find in a subsequent part of the present article, that these patrons of phar-

macy are ignorant of some approved processes in pharmacy; and that even the examiners themselves are glad of the assistance of their chemical operator, in answering some questions on the subject put by a non-professional gentleman.

Before concluding these preliminary remarks, it may not be unnecessary to state, that the apothecaries of England consit of two distinct classes of individuals, the Licentiates and Members. The former have no share, either in the management of the funds of the corporation, or in the election of office-bearers, the regulation of the course of study, or the execution of the act of 1815. We wish it to be understood that in this article our remarks have no reference to these individuals.

The privileges of the members of the incorporation may be thus briefly stated: 1st, The Master, Wardens, Examiners and Treasurer are chosen from among them: 2nd, Their apprentices have the advantage of attending lectures upon Materia Medica and Botany, and during six months of the year of going into the country, in company with a demonstrator appointed to instruct them in botany, refreshments being allowed them at their first two meetings. At the end of their apprenticeship they may enter the incorporation free of expense, while others, must pay a fine of one hundred pounds sterling. This last privilege, however, seems not to be worth £100, inasmuch as no one had entered the incorporation by redemption, for seven years previous to March 1834: 3rd, The Master, Wardens, Examiners, &c. have the power of regulating the affairs of the society, and the course of study to be pursued by candidates for their license. To them also is committed the carrying into effect the other provisions of the act of 1815.

Our readers will now be in a condition to examine with us the evidence adduced by different members of the society of Apothecaries, who have come forward to communicate information to the Committee of the House of Commons, respecting medical education, and other matters connected with the profession. In the remainder of this article, then, we shall consider, *first*, how the public duties entrusted to the Society of

Apothecaries have been fulfilled. *Secondly*, the suggestions offered by the witnesses respecting medical education. *Thirdly*, we shall examine those charges and insinuations which have been made against the Edinburgh School, and in conclusion, we shall show that we had good grounds for making those assertions regarding the incorporation, and several of its influential members, which we felt it our duty to do at the commencement.

I. *In what manner has the Society of Apothecaries exercised those privileges and fulfilled those duties which were entrusted to it by the charter of James* I. *and the act of* 1815? The duties of the society may be classed under four heads. 1. To examine the medicinal articles kept by apothecaries. 2. To prosecute unqualified practitioners. 3. To prescribe the course of education to be followed by all those intending to apply for a license. 4. To examine all candidates. 5. To keep at the Hall a supply of pure articles used by apothecaries. We shall now inquire how each of those duties have been fulfilled.

Examination of Apothecaries' shops. The following extracts will show how this is conducted. "How is the visitation of apothecaries' shops by the wardens of your society, in company with the censors of the College of Physicians, conducted? The physicians call upon the Society of Apothecaries twice a year, I think it is, to send their wardens to assist them in the examination of the shops. Is the day fixed? The day is fixed; it is in the summer and the autumn of the year. Is it pretty well known before hand on what day the visit will take place? Yes, it is, but there has been some alteration made lately; one of the examinations is postponed to a later period of the year; they were very nearly together. About what period of the year is it? I think it is this very month, (June.) In short, both have taken place in this very month, but upon the last examination it was thought better to postpone the second examination till towards the end of the year. How many shops are generally visited in a day? I dare say from forty to fifty. I was on these examinations

last year twice. How many were visited in a day on that occasion? I should think, between forty and fifty. Do you keep a record of the names of the shops visited? The beadle of the College accompanies the deputation and takes the name of the individual keeping the shop, and minutes any observations that are made by those who examine, and on the appearance of the drugs. And that book is kept? Yes, I suppose so; but it is in the keeping of the College of Physicians. At what hour of the day does the visitation commence its proceedings? I think somewhere about one o'clock. And when does it end? It ends about six. How long, upon an average, does the visitation of each shop last? Perhaps a quarter of an hour;—not so much. Besides the visitations of the shops of apothecaries and druggists, which the officers of your society make in company with the censors of the College of Physicians, do they, sole and unaccompanied by the censors, make any similar visitations, by virtue of the authority granted to them by the act of 1815? Yes, we are bound by the charter, as well as the act of Parliament of 1815, to visit apothecaries' shops, but not those of druggists; we have no power over druggists. Are you, sole and unaccompanied by the censors of the College of Physicians, in the habit of visiting apothecaries' shops? Certainly. Upon what officer does that duty devolve? It devolves upon the Court of Assistants, or if necessary, upon some men of the livery of the society. A power is invested in the master of the society to appoint and direct certain individuals to undertake this office. Is a search by the members of your society, so appointed, constantly going on, or is it only on extraordinary occasions that it is directed to be made? For a great many years a search was made every year, but lately it has been but once in two years. But one day, once in two years? One day, or more than one day, depending entirely upon the district they visit, and upon the number of visits they have to make. We have now and then gone thirty miles from London, and that cannot be accomplished in one day. Do they now by virtue of these powers, make visitations all over England and Wales?

They do not and never have done so. Have they not the power by virtue of the act of 1815? They have ; they have the power of appointing searchers in the country. You have stated that they do not visit druggist's shops. Unattended by the censors of the College of Physicians have you any power to visit these shops—attended by the censors you do visit them? Yes we do. Your search in company with the censors is confined to the city of London? Yes. Is visiting twice a year, effectual in preventing, within the precints of the city of London, the sale of bad or spurious medicines? My opinion upon that subject is this, that it is not by any means so efficient and complete a law as is desirable, that there are many ways and means of passing off adulterated medicines, which no search can prevent. I do not see how it is possible to prevent it. No search you say can prevent it? It is not, therefore, to the imperfection of the present law of search, but to the principle of the law of search in general that you object? I think I may state, with regard to the present race of general practitioners, that for the most part they are men of such standing and acquirements as scarcely to be supposed capable of fraud. The question refers to the use of visitations, of such especially as are made in the city of London, by your wardens and the censors of the College of Physicians. No search, you say, can prevent the sale of adulterated medicine on the part of those who are disposed to sell it? I think not. I think it fails in accomplishing that purpose; that it may do some good is possible,—but there are plenty of opportunities for frauds, if people are disposed to commit them, in spite of searchers. Is not the search in question less efficient than it might otherwise be, owing to its being made on two days only in the year, and those days occurring at fixed periods, so that all parties whom it may concern are duly apprized before-hand when they may expect a visit? Yes, I think so. The mode, therefore, of conducting the search renders it still more ineffectual, than even, if well conducted, it still must be? I think so. As the search that is made by your

society of all the apothecaries' shops in England and Wales, takes place but once a year, (we are told that this search never took place,) is not that still less efficacious than the search that you made together with the physicians? Yes, I must admit that. Are your visitors provided with tests, or any other means of making extemporary trial of the purity of any articles in the Materia Medica? Some few tests that apply to specific medicines; poisonous medicines, for example, and medicines of specific virtues. Does the search,—either that which you make singly, or that which you make in company with the physicians,—afford to the public any reasonable degree of security against the sale of bad or spurious medicines? I think not, if the disposition existed to sell such medicines." —*Evidence of John Nussey, Esq.* pp. 38. 68.

In this case we find a most important duty in some cases altogether neglected and within a limited district performed in a most careless and inefficient manner. Mr. Nussey makes an attempt to palliate this negligence by stating, *first*, that the law is inefficient; *secondly*, that it is useless and would be so in any case, in consequence of its being impossible to convict the guilty; and *thirdly*, that the general practitioners are of such standing and acquirements, as to place them above suspicion. He is then forced to assert that such searches do some little good, even when conducted on the present absurd plan, and that more good would be effected if the search were to be more effectual. Last of all, to revert to his first stated opinion that the search does not give the public any reasonable degree of security against the sale of bad or spurious medicines, omitting all consideration of these contradictory opinions, unbecoming the head of a society invested with so extensive powers, we cannot see upon what principle the incorporation are justified in not fulfilling a duty positively imposed upon them by law; or if they possess a dispensing power, upon what principle they refuse to exercise it in other cases where it would be attended with positive advantage to the community.

We are unwillingly forced to conclude, that had the apprenticeship clause entailed on the incorporation as much trouble and as little profit as that which directs them to search Apothecaries' shops, we should have seen it fall into desuetude, and have been favoured with many very cogent reasons, or at least ingenious reasons for its being allowed to do so. We cannot pass over this part of the evidence without calling the attention of the reader to the doubt and ignorance, either real or affected, displayed by the Master of the Apothecaries' Company, in respect to matters on which no one could possibly suspect that there could be the smallest hesitation in the representative of the Society. He speaks with hesitation of the number of times in the year the physicians examine the drugs of venders of medicine, and in answer to the next questions, states positively that the search is made twice, and that the seasons are summer and autumn. He next discovers that they both take place in June, and so on.

Now if there was a single point on which the Master of the Apothecaries' Company could convey information, we would have thought that it would be in regard to its powers and privileges. We shall see, however, hereafter, that his knowledge of such points is accurate and extensive, compared with that displayed by him regarding others, and that he knows, perhaps, less of the educational course of the Edinburgh College of Surgeons, than a first year's Edinburgh student, of the qualifications necessary for him to possess before he presents himself before the Examiners of the Worshipful Company.

It is unnecessary for us to quote other evidence to convince our readers that the Society of Apothecaries have failed in the performance of a duty, the due fulfilment of which, is of the utmost importance to the community. We cannot see how it is at all more difficult to detect spurious medicine, and bring the guilty to punishment, than it is to discover when porter or ale has been adulterated. But the difficulty of performance will not excuse its not being done at all. We are told that a visit to a shop lasts less than a quarter of an

hour; but granting that the search lasted fifteen minutes, we contend that it is utterly impossible to have ascertained even by the label, the contents of each bottle and drawer in a shop of the smallest dimensions, much less to have removed the stoppers and opened the drawers. It would appear from Mr. Nussey, that they carry some few tests applicable to specific medicines, and the instance which he gives of specific medicines is poisonous medicines, and medicines of specific virtues. It becomes absolutely ridiculous to see language so loose and unscientific made use of by the representative of a society, the office bearers of which arrogate to themselves the merit of being the only board which ascertains effectually the knowledge possessed by a candidate of pharmacy, materia medica, and practice of physic. Verily, we are not astonished, that so many who have been educated at the northern schools, have been rejected by the learned Society of Apothecaries. For ignorant persons with authority on their side and want of intellect in their heads, it is easy to reject those who are better informed. But enough of this for the present. We shall return to the subject in the course of the present article.

(*To be Continued.*)

ART. XV.—POISONING BY ARSENIC EMPLOYED EXTERNALLY.

The Archives Generale de Medicine, in the number for June 1836, report (from the Medicinische Annalen von Puchelt, Chalius und Nargele To. 1—N. 3) the following observation of Dr. Kuchler:

The wife of a waterman, aged 68 years, had been for six years the subject of a bronchitic affection with viscid mucous expectoration which affected her health, without, however, hindering her from pursuing her occupations. Within the last seven or eight years, there had developed itself about the centre of the right temple, a pustule which, from continual irritation, degenerated into a fungous tumor; its growth was so rapid, that two years ago she applied for relief. The action of caustic caused it to diminish considerably; but finally it acquired double its original volume; and discharged when compressed a considerable quantity of blood and pus. The strength of the patient, her embonpoint, her sleep and appetite diminished to an alarming degree. Dr. Kuchler was consulted in November 1834. The diameter of the tumor was 30 lines, its prominence was only 2 lines and a half, its consistence soft, analogous to that of a cauliflower, with irregular edges turned inwards, and at some points embossed; the tumor was not painful except when there was a change of temperature. When touched there was a discharge of blood and pus. It was moveable without adherence, it extended from the external margin of the eye to the ear. The surrounding parts were in good condition.

After having successfully combatted the cough, the dyspnœa and the expectoration, Dr. Kuchler employed to the tumor lotions of corrosive sublimate, which diminished the purulent and sanguineous discharge. But being desirous of effecting a complete cure, he had recourse on the 19th of November to the arsenical powder of "frere Gomé." He did

not employ more than $\frac{4}{5}$ of the quantity resulting from the following formula:

℞	Red sulphuret of mercury	gr. ij.
	White oxide of arsenic	ʒ ij.
	Dragon's blood	12 gr.
	Animal charcoal	8 gr.

This powder was mixed with a little water to form a pap, which was spread over the tumor; perceiving that transparent lymph oozed from all the openings, the Doctor applied to them the preceding powder. The layer of paste was about a line in thickness. The diseased surface was left exposed to the atmosphere without any other dressing. Six hours afterwards reaction commenced; on the 21st in the evening, the inflammation had attained its maximum of intensity, the redness, during the extension of which the patient had suffered very great pain, had now taken possession of half the face and the eye of the opposite side.

The integuments of the cranium had however suffered very little, and the general condition of the patient appeared sufficiently satisfactory. An emulsion was nevertheless prescribed with cherry laurel water. But in proportion as the redness disappeared, an inexpressible uneasiness, extreme anxiety and so much dyspnœa supervened, that the patient could not respire but in the upright position and by forcibly bringing into action all the muscles of the thorax. She laboured under a sense of constriction about the præcordial region, her tongue was covered with thick fur, with intense thirst; sharp colicy pains were experienced with desire to go to stool, followed by a discharge of pus without any fecal matter.

To treat these horrible symptoms, Dr Kuchler exhibited fifty grains of ipecacuanha in the space of an hour and a half; some vomiting of bile, mucus and gastric juice followed, brought up with great effort. The violent symptoms continued to augment, the patient was delirious if she slept, and salivated continually, the root of her tongue was painful and swollen, in consequence of which deglutition was difficult, the extremities were inclined to become cold, a cold sweat covered her

forehead. On the 22d in the evening, an emulsion was prescribed consisting of Castor oil and manna; to reduce the swelling of the tongue, four leeches were applied to it. The next day the tongue was hot, so intensely red and so swollen that deglutition was almost impossible; several half fluid stools occurring during the day appeared to produce some diminution of the constriction and of the symptoms occasioned by the tumefaction of the tongue; the extremities regained a little warmth; but very soon after the dyspnœa became extreme, the pulse almost imperceptible, the forehead and extremities cold, the lips bluish, and the mucous rale announced that death was near at hand, when the patient could just state in a feeble voice that this alarming change had come on half an hour before. She died 96 hours after the application of the arsenical paste. 24 hours after death, the body was cold, bloated, and the whole of the posterior portion of the body coloured bluish. The friends opposed an autopsy.

Dr. Kuchler did not doubt that the patient had died from poisoning, the symptoms of which are undeniable, from the constriction of the heart, the anxiety, the palpitations, the dyspnœa, the thirst, the salivation, the swelling of the tongue, the difficulty of deglutition, the colic, the tenesmus: he thinks that from the softness of the tumor, the exudation from it having rendered liquid the arsenical paste, this after having acted upon the diseased parts, came in contact with the healthy parts, by which it was absorbed, the absorption being favoured by the general condition of the patient.

The author deduces from this case the following practical conclusions.

1. That the use of arsenic is contra-indicated when the part is soft and not indurated.

2. That the least active arsenical preparations are dangerous in cases of this kind, and that it is better to use the paste of corrosive sublimate, according to the method of Græfe.

3. That some hesitation should exist as to the employment of arsenic, even in cases of true scirrhous, lardaceous, fibrous,

and cartilaginous indurations, if the ganglionic system at the same time is brought into sympathy.

4. Dr. Kuchler is of opinion, that when arsenic is employed, those forms of preparation should be selected which are now in use among the most skilful surgeons.

N. B.—It would be useless to remind our readers that this is not the first time, that accidents have occurred in consequence of the use of the arsenical paste. We may also remark that the employment of corrosive sublimate is also not without risk. Of this the following case is a proof:—

A child 6 years old, labouring under bronchitis, of lymphatic constitution, hair thin and flaxen, had been often affected with vermin of the head. As is my practice, under similar circumstances and never previously with any inconvenience, I prescribed a powder of 6 grs. of calomel and two drachms of anise, to be sprinkled over the head and then covered with a night-cap. This was during the warm weather of June. Two hours after the application, the child experienced violent pain in the head, the scalp became red and tumefied, and frequent vomiting ensued. The head was washed carefully, and allowed to remain uncovered as before, a cataplasm was applied to the abdomen, and as every species of drink was rejected, even cold sugared water, several hours were allowed to pass without allowing any fluid to be swallowed, injections of starch were administered every five or six hours. The vomiting soon ceased completely, the intense fever, and the great heat which had accompanied the vomiting subsided, the child was gradually put upon the use of gum-water, at the commencement given by the tea spoonful hourly. Was not the deuto-chloride of mercury employed instead of the proto-chloride?

One thing alone could have favoured the action of the proto-chloride; it is, that upon the day that the powder was employed, three scabs from a papulous eruption which had developed itself upon the head, had been removed, over these places, scarcely three lines in diameter, the cutis was left bare;

this effect was, however, so little apparent, that upon the same evening the places had dried up.

We have already cited in our Journal so great a number of analogous facts, that it is not necessary to state here, that these extraordinary effects, in other respects rare, are the consequences of some individual predisposition, which will be met with by even the most careful practitioners.

ART. XVI.—REPORT MADE TO THE SOCIETY OF MEDICAL CHEMISTRY UPON A NOTE ADDRESSED TO IT BY M. GUYOT, A PHARMACEUTIST OF PARIS, ENTITLED "OF THE DECOMPOSITION OF ESSENTIAL OILS BY IODINE."

Gentlemen:

M. Guyot, in the note addressed to you, has examined with more care than has hitherto been done, the action of iodine, both with and without heat, upon certain essential oils. He has discovered that many of them, as for instance, the oils of lemon, turpentine, naptha, and juniper, react violently and instantaneously when brought in contact with iodine at the ordinary temperature, and that others, on the contrary, produce a reaction at the end of a period more or less prolonged; in this second category are placed the oils of mint, sage, lavender, absinthium, &c. &c.

Upon distilling the solutions of iodine in the essential oils of turpentine and savin, M. Guyot has observed that from the first impression of heat throughout the whole time of the operation a vivid reaction goes on, with a very abundant disengagement of hydriodic gas, and that finally, there remains in the retort an abundant residuum of carbon.

The formation of so large a quantity of hydriodic acid has

led the author to make use of this acid in the preparation of the iodurets of potassium and sodium, and of the hydriodate of ammonia, by passing through the alkaline solutions the product of the reaction between the vapours of iodine and the oil of turpentine.—The apparatus which M. Guyot has employed, and which permits, according to his account, of saturating some ounces of concentrated alkaline solution with a small quantity of iodine, consists in bringing together in a globe with three tubulures, from one side the vapour of the oil of turpentine, and from the other the vapour of iodine, and then conducting the product of the reaction through an alkaline solution, by means of the third tubulure.

Although it is very likely, that iodine, in its reaction with the essential oils, does not solely unite with their hydrogen and liberate their carbon, we think that the society, in thanking M. Guyot for his interesting communication, ought to request him to examine some other products which he has observed in the course of his experiments, in order to complete the work which he has commenced; as for instance the *spirit of balsamic resin*, which he has noticed in the product of the distillation, and a *white flocculose matter* which is separated with the ioduret of potassium by saturating the hydriodic gas obtained in this way. A new examination of these products, as well as their elementary analysis, may perhaps demonstrate that the iodine in its reaction with the essential oils, is substituted for the hydrogen to form new combinations, as has already been observed to be the case with chlorine, in certain organic compounds.

While expecting that M. Guyot will publish some new experiments which we would desire him to make, we recommend the society to insert in its Journal, the note addressed to it by this pharmaceutist.

Lassaigne. Journal de Chemie. Med.

MISCELLANY.

Composition of Asses milk.—By M. Peligot.—The author has endeavoured to determine if chemistry is not capable of furnishing some data upon the composition of Asses milk, which will explain the reason why it has been preferred by practitioners. His conclusions are the following:

1. That this milk differs essentially from others by the greater proportion of sugar of milk, a proportion which is increased upon an average to 6.29 for .070. M. Peligot has moreover examined the influence of food upon the quality of the milk. Finally he has stated, contrary to the opinion generally received, that the milk obtained from a second milking, is rich in solid matters, in proportion to the shortness of the interval between it and the first, and that from the same milking, the amount of solid matter increases from the portion first drawn to the last.

Journal de Pharmacie.

Sugar of mushrooms.—Three very distinct species of sugar have been admitted; but at the same time one of these species has been very little studied, viz. the sugar of mushrooms. M. A. Bussy has made the analysis of very pure and crystalline sugars from cantharellus merulius and clavaria coralloides, and has found that these substances were nothing else than mannite, the properties of which they moreover possess. M. Malagutti on his own part, had arrived some time since at the same conclusions, relatively to the sugary substance obtained from another species of mushroom, but the little amount which he had with which to manipulate, did not allow him to draw any definite result from his experiments.

A specimen of sugar obtained from ergot of rye, which has been regarded by some naturalists as a species of fungus, in an equal degree exhibited the properties and composition of mannite.

Journal de Pharmacie.

Oil of the cherry laurel.—Chlorine in solution by acting upon the oil of bitter almonds, produces a shining neutral crystalline substance, which may be considered as formed of an atom of benzoic acid and two atoms of hydroguret of benzoic. We have witnessed the oil of cherry laurel acted upon in the same manner, and obtained a compound similar to the crystalline substance which is furnished under the same circumstances.

Adulteration of iodine.—STIEREN has detected several adulterations of iodine by dissolving the latter in spirit. The impurity remains undissolved, consisting sometimes of iron, silica and alumina, at other times of iron containing carbonaceous matter. Buchner has found glance coal.

Buchner's Report and Records of General Science.

Morphia in native green poppy heads.—According to Du Menil, morphia exists in common poppy heads, but in small quantity. He evaporated the expressed juice of the poppy head in a water bath to the consistence of honey, exhausted the residue with spirit of 80 per cent., slightly rendered acid by sulphuric acid, distilled the greenish solution, added water to it, filtered it, neutralized the solution with ammonia, although not completely, precipitated it by a solution of galls, collected the precipitate, washed it, digested it with lime water, dried the mixture in a water bath, pulverized it, digested it with spirit and distilled. The residual solution left behind a small quantity of a resinous matter (3 lbs. poppy heads gave ½ gr.) which tasted somewhat bitter, and was coloured scarlet by concentrated nitric acid, and blueish by chloride of iron.

Records of General Science from Central-Blatt.

Cochineal of Ararat.—In that part of Armenia which is now incorporated with the Russian empire, in the province of Erivan, and in the vallies of Araxes, a species of cochineal insect is found, which, according to M. Hamel, appears to be unknown to naturalists. It is met with principally in the villages of Schorly, Sarwanlar, Nedscely, Hassan, Abad, &c. M. Hamel, by giving a view of the different authorities who have mentioned it, shows that it enjoyed an important rank in commerce until the period when the American cochineal shut it out of the market. It is very distinct from the cochineal of Poland. A pound of Armenian cochineal contains only from 18 to 23 thousand insects, while that of Mexico contains 20 to 25 thousand, and that of Poland 100 to 130 thousand. It contains also more colouring matter in an equal weight than the Polish. It is found abundantly on the roots of the Ærolupus lævis (Trinius), a plant which grows abundantly in Erivan. Brandt proposes to call it Porphyrophora Hamelii.

Records of Gen. Science.

Inferiority of English to China Ink.—The directors of the Bengal bank lately refused payment for a number of bank notes, in consequence of their containing no signature. It appeared that they belonged to a Hindoo, who had kept them in a copper box. He asserted that they originally possessed the signatures of the director, comptroller, cashier, &c. but that they had been effaced. The notes on which the signatures had been written with China ink remained uneffaced, but all the writing with English ink had completely disappeared. Mr. Princes sin order to determine

the question, placed a paper covered with writing in English ink between two plates of copper. After a short space of time he found that the copper had decomposed the ink, and that the writing was completely effaced. He concluded that the account of the Hindoo was correct; and that the bank ought not to refuse payment.

Asiat. Soc. Journ. and Rec. of Science.

Volatile oils.—Volter and Darrn have made a set of experiments to determine the relative produce of oils to the raw material employed. The following is the result.

We use the German measures, which approach nearly our own, the Nuremberg pound being equal to .959266 pound Troy, the lb. or civil pound consisting of 16 ounces. Multiplication by this number gives the equivalent in English.

1. *Oil of bitter almonds.*—26 pounds of almonds, pressed cold, and then distilled with water, gave 10½ pounds of fat, and two ounces of volatile oils.

2. *Ol. anisi aeth.*—16 lbs. of anise seeds gave 9 ounces of volatile oil and 10 lbs. 2½ oz. of the same, spec. grav. 0.984.

3. *Ol. anisi stellati.*—10 lbs. of the seeds gave 22 drs. volatile oil.

4. *Ol. calami aromat.*—14 lbs. of dry roots left 20 oz. volatile oil, 118 lbs. fresh roots were peeled and the 25 lbs. of bark left by distillation 3½ oz. of oil; the roots when dried weighed 13½ lbs.

5. *Ol. carvi.*—15 lbs of the seeds gave 7 oz. of oil, 10 lbs. gave 9 oz. of spec. grav. 915.

6. *Ol. caryophyl. aromat.*—1 lb. gave 20 to 21 drs.

7. *Ol. caryophyl.*—6½ lbs. when distilled three times gave 18½ oz. oil of spec. grav. 1.232.

8. *Ol. ceræ.*—1½ lb. *cer. flav.* gave by dry distillation, 5 oz. 5 drs. of oil.

9. *Ol. coriandri.*—32 lbs. of the seeds gave 2 oz. 9 drs. oil.

10. *Ol. cynæ sem.*—165 lbs. of the seeds left 14 oz. 3 drs. oil.

11. *Ol. cynæ.*—5 lbs. seeds of *cyn. levant.* gave 4 drs. 1 scr. oil, ½ lb. seeds of *cyn. lev.* gave 10 drs. *ext. cyn. aeth*; 2½ lbs. *sem. cyn. barb.* gave 3 drs. 50 grs. oil. 13 lbs. *sem. cyn. natur.* left 2⅝ lbs. of an earthy powder effervescing with acids.

12. *Ol. Fœniculi.*—12 lbs. seeds gave 5 drs. oil, 3 lbs. seeds gave 14½ drs. oil, spec. grav. 0.968.

13. *Ol. junip. bacc.*—21 lbs. of fresh berries left 26 drs. clear oil.

14. *Ol. macis.*—1½ lb. mace gave 18½ drs. oil, of spec. grav. .920.

15. *Ol. marjoranæ.*—82 lbs. left 11 oz. oil.

16. *Ol. menth. piperit.*—374 lbs. of the plant gave 49½ oz.

17. *Ol. petroselini.*—4 lbs. seeds afford 1½ oz. of an oil sinking to the bottom of water.

18. *Ol. sinap. sem.*—35 lbs. gave 11 drs. of oil, and by other experiments 15 lbs. gave 6 drs. and 50 lbs. gave 31 drs. The greatest product was 8 drs. oil from 10 lbs.

19. *Ol. æther. tanacet.*—20 lbs. of the tops gave 1 oz. of oil.

20. *Ol. valer. æth.*—10 lbs. of the root gave 12 drs. oil and 22 lbs. gave 18½ drs. of oil, spec. grav. .960.

Records of general science and Central-Blatt.

Composition of Bitumens.—M. Boussingault has, from his researches, been led to the conclusion that the Bitumens should be considered as mixtures of two substances, one liquid to which he has given the name of *petrolene*, the other solid which he calls *asphaltene*. It is the viscid bitumen of Bechelbornn, department of Bas Rhin, which has been particularly the object of the researches of M. Boussingault.

Petrolene.—Is an oily substance, volatile, possessing a bituminous odour, of a pale yellow colour, it is composed of hydrogen and carbon only; it boils at 280° R. (662 F.)—Its specific gravity is 0.891 at 21°, it remains liquid at 12°, is little soluble in alcohol, and very soluble in ether. It is obtained by distilling the bitumen of Bechelbornn with water; it passes over with the aqueous fluid, upon which it floats. Upon analysis its composition is

Carbon	0.885.
Hydrogen	0.115.
	1.000.

The density of its vapour by experiment is 9.415.

From these results it is seen that petrolene is isomeric with the oils of lemon, of turpentine and of copaiba, and that the density of its vapour is nearly double that of the vapour of turpentine. By admitting that 4 volumes of vapour constitute an atom of petrolene, its atomic constitution is the following, $C^{80}\ H^{84}$.

Asphaltene.—Is solid, black, brilliant, it softens by heat, near 300° R, but is decomposed before melting. It is composed of

Carbon	0.753
Hydrogen	0.099
Oxygen	0.148

Which can be represented by the formula $C^{80}\ H^{64}\ O^{6}$ which would seem to prove that asphaltene results from the oxidation of petrolene. It is obtained by submitting the bitumen of Bechelbornn, purified by the prolonged action of ether to a temperature from 240 to 250° R.

The asphaltum of mineralogists has a composition very close upon that of asphaltene.

Journ. de Pharmacie.

Mucate of Methylene.—This combination which may be represented by mucic ether, in which the bicarburet of hydrogen may be replaced by the methylene, has been obtained by M. Malagutti, by following exactly the same process, as for the preparation of mucic ether, but at the same time substituting spirit of wood for alcohol. This compound is solid, fixed, crystallizable, colourless, insipid, soluble in water, but little so in alcohol. It is composed of

Carbon	40.7.
Hydrogen	5.9.
Oxygen	53.4.

its formula according to the author should be $C^{12}\ H^{8}\ O^{7}$ mucic acid + $C^{4}\ H^{4} + OH^{2}$ hydrated methylene, which formula is similar to that of mucic ether recently given by M. Malagutti and which presents a new probability, that the true composition of anhydrous mucic acid is $C^{12}\ H^{8}\ O^{7}$ and not $C^{12}\ H^{10}\ O^{8}$, which has been admitted until the experiment of M. Malagutti. *Ibid.*

St. John Long's Liniment. Mr. Guthrie having had presented to him, for the purpose of trying its effects, some of the once famous liniment of Mr. Long, selected some cases for its application; and also had it applied to his own person, he being affected at the same time with a pain in the knee, attended with slight lameness. The experiment was conducted openly at the Ophthalmic Hospital, the liniment being applied by Mr. Wood, the person who rubbed under Long. It was used in five cases, besides Mr. Guthries' own; but the disease of one only is stated, viz—that of a boy who is said to "have come up amaurotic from the country." The result of the treatment is thus given by Mr. Guthrie: It cured my knee and the boy's eye, and did good to all the remaining four. The liniment appears to be perfectly mild and harmless, looking like thick yellow cream, and having a faint turpentine smell. Applied to the skin it felt cool and agreeable, and not in the slightest degree stimulating. It was assiduously rubbed on the part by means of a small, soft, round sponge; and after a sufficient application, the part became red, and finally excoriated and inflamed. Mr. Guthrie attributes the whole effect of the liniment to the mode of application and nothing to its own virtues. In proof of this, he had himself rubbed with soap suds in the same manner as was done with the liniment, and exactly the same result followed. I should have said, if I had been asked, says Mr. Guthrie, that the soap lather was the most severe liniment of the two.

The mystery of St. John Long's operations, and of his (doubtless) occasional success, seems thus cleared up, and we consider the profession much indebted to Mr. Guthrie for its solution. We do not doubt that

this particular mode of counter irritation may be very advantageously applied in many cases, both of acute and chronic diseases.

Lancet.

Some proofs of the efficacy of Guaco.—Some months ago we requested as a favour to be furnished with any facts relative to the medicinal virtues of the Mikania Guaco, which has been introduced, and is cultivated, in many parts of the Island. We also announced that Messrs. Menzies and Morison made a large quantity of the extract. It is unquestionably a plant which possesses more than ordinary powers. Cæsar Hawkins, a few years ago, received some of the plant from Sir Robert Kerr Porter, but he says, "the quantity was not sufficient to investigate the subject completely; it did not seem to him to do more than mitigate the symptoms of Rabies or Hydrophobia. Although I am inclined to think the accounts we have received are much exaggerated, it is well deserving of further trial, *as even a palliation of the frightful symptoms of Hydrophobia is yet a desideratum.*" The following Letter, from an intelligent friend, was given to us for publication: we know so much of the character of the writer, that we unhesitatingly vouch for the correctness and truth of his statements:—

Dear Sir,—I think it a duty to request, as I now do, your publication of my experience of the virtues of the Guaco Plant.

Some months ago, while washing my hands in the dark, I received a sting in the fore-finger of my right hand, from an insect which I believe was the long yellow wasp so common in this island. My hand became in a short time extremely swollen and very painful: I applied Brandy and Laudanum with little or no benefit, and during the night I had frequent recourse for relief to a cold lotion, into which I plunged my hand. The pain and swelling, however, continued almost unabated for some days, and I could scarcely attend to my professional duties on account of the general discomfort and irritation under which I laboured; I could scarcely hold my pen.—I called on my medical attendant, Dr. Prince, who, having the plant growing in his garden, applied some of the bruised leaves, and rubbed the hand all over with them for some minutes. The effect, in almost entirely obviating the pain and materially diminishing the hardness and swelling, was immediate; and from that hour I rapidly recovered. I may also mention, that at the same time I swallowed, by Mr. P.'s sugges tion, about half a wine glassful of the juice.

I take the liberty of mentioning another case. My friend, the Rev. Mr. P., was for some days laid up by severe gouty or rheumatic pains in his feet, which disabled him from walking, and he suffered acute pain during the night. Not regarding the attack as likely to be attended by serious results, he did not call in his medical attendant. We agreed, however,

at my suggestion, to try the Guaco, and that evening got a few leaves of the plant from a neighbouring garden; the effect was immediate relief of the pain. Next morning he sent his servant to the neighbourhood of Stoney Hill, where I understand it abounds, for a quantity: He continued the application, and effectually subdued the pain. I believe his ultimate recovery was also somewhat hastened by the application of cold lotions, in place of an injudicious use of warm wrappings of flannel, which he had adopted.

I once tried the Guaco for toothache. On this occasion I used one of the mixtures sold in the Druggists' shops. I took a small quantity into my mouth, as brandy and laudanum are sometimes applied in similar circumstances: the pain was relieved for two or three minutes, but it returned, and I could not subdue it by that means. I am not prepared, however, to say, that a more careful and judicious application of this valuable medicine might not have accomplished more; and it is especially to be considered, that I did not, when I made the external application, take it internally also, as perhaps I ought to have done.

I am, dear Sir, faithfully yours,

To Dr. Wm. Arnold. W. W. A.

Jamaica Phys. Journ.

Air Plants.—These attach themselves to the driest and most sapless surface, and flower as if issuing from the richest soils. "A specimen of one of these, which I thought curious," says Dr. Walsh, "I threw into my portmanteau, where it was forgotten, and some months after, in unfolding some linen, I was astonished to find a rich scarlet flower in full blow; it had not only lived, but vegetated and blossomed, though so long secluded from air, light, and humidity." The barren pine is not less extraordinary. It also grows on sapless trees, and never on the ground. Its seeds are furnished, on the crown, with a long filmy fibre, like the thread of a gossamer. As they ripen they are detached, and driven with the wind, having the long thread streaming behind them. When they meet with the obstruction of a withered branch, the thread is caught, and, revolving round, the seed at length comes into fixed contact with the surface, where it soon vegetates, and supplies the naked arm with a new foliage. In Brazil it grows like the common plant of pine apple, and shoots from the centre a long spike of bright scarlet blossoms. In some species, the leaves are protuberant below, and form vessels like pitchers, which catch and retain the rain water, furnishing cold and refreshing draughts to the heated traveller, in heights where no water is to be found. The quantity of this fluid is sometimes very considerable, and those who have attempted to reach the flower-stem have been often drenched by upsetting the plant.—*The Vegetable World.*

Citric ether.—In order to prepare this ether, M. Malagutti has followed the process of Thenard. He assigns to it the following properties, it is liquid, of a density of 1.142 at 21°, possesses an odour which is similar to that of olive oil, not volatile, decomposed by heat at 202°, is soluble in sulphuric and hydrochloric acids, nitric acid decomposes it immediately. Analysis has demonstrated its composition to be

Carbon	51.05
Hydrogen	7.29
Oxygen	41.66

Hence the formula is $C^8\ H^4\ O^4$ citric acid + $C^8\ H^8 + OH^2$ ether. From this analysis the author concludes, that the formula of citric acid, upon which some doubts still remain, in consequence of certain anomalies which it presents in its combinations with the bases, is $C^8\ H^4\ O^4$, as Berzelius has pointed out. It is especially to clear up this point of theory that M. Malagutti has had in view, in the memoir which he has presented to the academy. *Ibid.*

To obtain large heads on Roses.—In the Horticultural Register we find a method described to obtain large heads on standard Roses by marching in one season.

So soon as the plants indicate the circulation of sap, I begin to take off the head of the stock at the proposed height, bending so that the plant designed to form a head is brought close to the top of the stock. I pare from the stem two or three inches of the bark, with a portion of the wood, at the most convenient part for forming the junction, after which the stock is neatly made to correspond, and in such a manner that the part where the union is intended to take place is very little increased in size. Tonguing should be avoided, since it offers no advantage and often serves to weaken the union. They should be bound together with tape or good matting, and covered with a little moss which should be kept damp. Should the stock be very tall, or weary, the union of the parts would be strengthened and accelerated by making a small slit in the stock, and causing it to dip into the ground, or in a pot of earth placed for the purpose. The slit will heal, and throw out roots, which will support the head considerably; and after the head and stock are united, they will be pared off without the place being seen or the least injury being done.

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Drawn from Nature by W.P.C. Barton

Tanner Vallance Kearney & Co. Sc.

LOBELIA INFLATA.

(Wild-tobacco.)